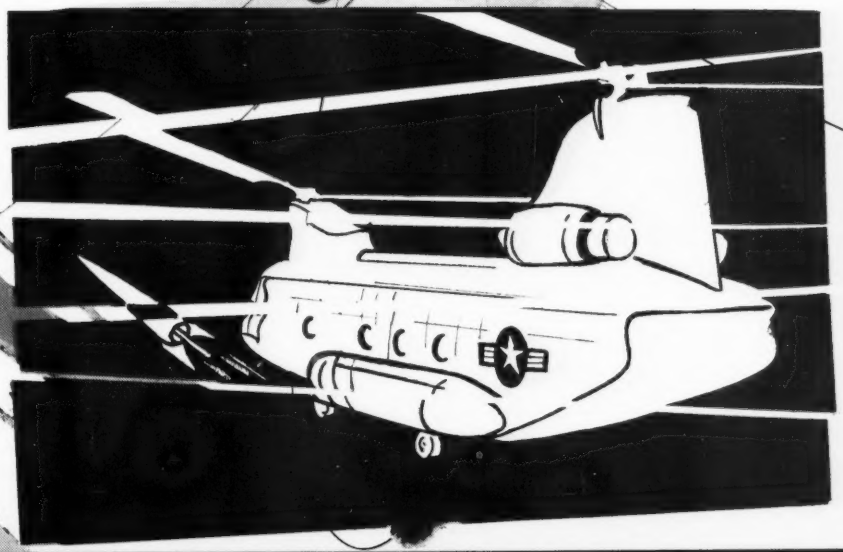
MAY 1960

UNITED STATES ARMY AVIATION DIGEST



United States Army

AVIATION DIGEST

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The Crescent Saber

Old Genghis Kahn and Alexander too
And Caesar, Frederick, Hannibal, and Lee —
Through all the centuries they found the horse
Would furnish all required mobility.

Our World is shrinking. The horse and spur are gone.
The "yellow ribbon" no longer holds the rein.
'Twas first the motor, with wings not far behind
Supplanting horse with truck and tank and plane.

In 'fifty-six a "saber in the sky"
Revived the thoughts of Cavalry of old
And grew until the "Vanderpoolian" sect
Had preached his word and had his concepts sold.

The crescent saber, its long arm 'cross the sky,
Displays a freedom the soldier has not known
Since Genghis Khan, and others in his van,
With horse and spur did claim the world their own.

The "Saber in the Sky" Grows Longer and Sharper, Promises to be a Major Force of Modern Army

Captain Thomas R. Hill, Arty

Less than a year ago the DIGEST carried an article entitled "Saber in the Sky," which introduced many readers to the revolutionary and thought provoking concepts of armed helicopters and aerial combat reconnaissance. Told were the initial dreams of Brig Gen Carl I. Hutton (former CG, Fort Rucker) and Colonel Jay D. Vanderpool (former director, CDO) and the many obstacles posed by lack of previous supporting examples, innumerable nonbelievers, and the inevitable lack of funds. The article described the evolution of the concept in three short years from an idea of a few men of vision to the formation of the experimental Aerial Combat Reconnaissance (ACR) Company and the far reaching impact of its tactical demonstrations.

Since then the snowball so painstakingly pushed to the top has finally started rolling under its own momentum. The saber is growing longer and sharper and shows promise of soon be-

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Captain Hill is presently on TDY to the 3rd Army Instrument School. He is dual rated.

coming a major force in our modern army.

Although the ACR Company was equipped with makeshift weapons and woefully undermanned (and still is), the potential shown was so convincing that nonbelievers were, almost without exception, converted on the spot. Some of the onetime outspoken opponents of Army Aviation have in the last few months become staunch supporters of the armed helicopter mobile task force.

Although the ACR concept was on everyone's tongue and the idea influenced a high percentage of the Army's planning for the future, the unit had never been truly tested in the field. To partially rectify this situation, in 1959 USCONARC directed the U. S. Army Armor School to prepare advance plans for an armed helicopter mobile task force, designed to perform and augment the traditional missions of armored cavalry. The Armor School was further directed to prepare a draft training text and a tentative plan of test for use by Third and Fourth Army in training and troop testing the projected unit.

In compliance with the directive, the Armor School, using armament and concepts developed at U. S. Army Aviation School, designed an Aerial Reconnaissance and Security Troop (ARST) closely patterned after the experimental ACR Company at Fort Rucker.

After review and minor changes by CONARC, the troop was activated at Fort Benning as a test unit assigned to the 2d Infantry Division. In January 1960 it was moved to Fort Stewart for training and testing.

The 2d Infantry is to be congratulated for fielding an adequately trained and well equipped unit in a minimum of available time. A test unit formed from organic personnel sorely needed elsewhere could conceivably have been an unwanted orphan receiving only leftovers and operating on a shoestring. Instead, through maximum cooperation and crack leadership, a capable, well trained unit evolved.

A final report of the test has not been published, but Gen L. L. Lemnitzer, Army Chief of Staff, recently reported that "all tests to date" of armed helicopters indicate the Army will continue to use helicopters in future conflicts. He also said that the January tests of ARST at Fort Stewart were promising . This troop used techniques and armament designed at Fort Rucker.

Brig Gen Clifton F. von Kann, Director of Army Aviation, had this to say about the test: "... I wish to report that the test of the Aerial Reconnaissance and Security Troop at Fort Stewart, Georgia gives every indication of being an outstanding success. In spite of countless problems of equipment shortages, the organization has proved its capability and versatility.

"This unit, formed within the ranks of the 2d U. S. Infantry Division last August, has grown from an inexperienced group to a well-trained and cohesive team. As organized for test, the ARS troop is made up of 35 officer and warrant officer aviators and 115 enlisted personnel. For equipment they have sixteen reconnaissance and eleven utility-transport helicopters. All of the reconnaissance helicopters except the air ambulance are armed with dual fixed-mount machineguns. Four helicopters of the weapons platoon are armed with 4.5-inch rockets and machinegun kits. The potential of this organizational concept offers one of the greatest growth aspects to Army Aviation. We can foresee a need for such a unit organic to every division and to every cavalry squadron."

From observation of the tests and conversation with other visitors, it appears that the concept of the armed helicopter mobile task force is no longer disputed. Many were present who did not like the organization and many more who criticized the tactics and techniques of employment, but there were none who denied the feasibility.

Organizations will change as concepts of employment mature and ACR takes its place among combat units. Equipment will improve with the advent of weapons systems specifically designed for aircraft (a few are already under test), and of aircraft with improved performance, reliability, and greater ease of maintenance.

The history of the airmobile task force has just begun. Already advance plans have been prepared for battalion size units, and studies have been conducted for larger forces. Divisions are being authorized to arm helicopters, and Seventh Army has designed and built its own armament kit. We are witnessing a great step towards the ultimate goal of Army Aviation: to provide the Army with unrestricted air mobility in the Army combat zone.

THE ARS TROOP

The Aerial Reconnaissance and Security Troop is a completely airmobile, air-mounted,

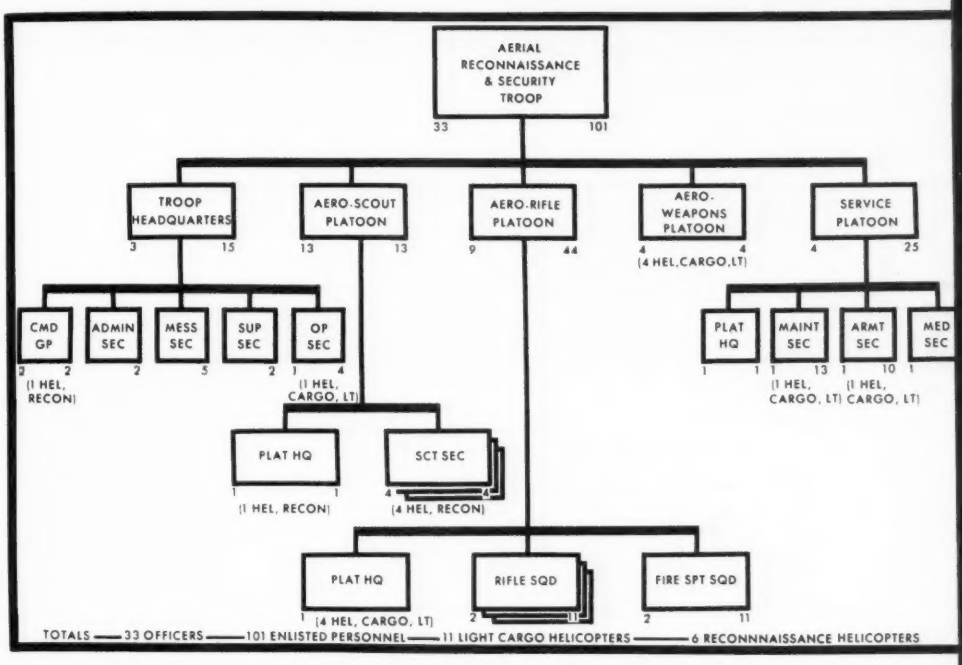
fast moving, hard hitting unit. It serves as a flexible means of searching out and fixing the enemy, performing most of the traditional missions of cavalry at an accelerated pace. The force has the capability of performing varied missions, including covering action, reconnaissance and counter-reconnaissance, flank protection, rear area defense, anti-airborne, anti-infiltration, and economy of force.

The unit is the original proposal of the U. S. Army Armor School. It is a balanced arms force consisting of command, reconnaissance, troops, weapons, and support (33 officers and 101 enlisted personnel). The tactical forces are 100 percent airmobile in organic air vehicles. The final TOE recommendations of the evaluation are awaiting approval.

Successful employment of the ARS troop is based upon complete utilization of its unique characteristics and capabilities, and an understanding of its limitations. It is designed to extend the reconnaissance and security capabilities of its parent unit. Normally ARS should be employed in close coordination with ground units so that advantages inherent in each unit can complement those of the other. It can be employed independently for limited periods and indefinitely when a part of a larger force.

The basic combat elements of the troop are an Aero-Scout Platoon, Aero-Rifle Platoon, and Aero-Weapons Platoon.

The Aero-Scout Platoon consists of a platoon headquarters with one reconnaissance helicopter and three scout sections of four recon helicopters each. The platoon conducts aerial reconnaissance and neutralizes



The organization of ARST as originally proposed

enemy forces. The helicopters are armed with .30 caliber or 7.62mm machineguns.

The Aero-Rifle Platoon consists of a platoon headquarters, three rifle squads, and a fire support squad. Each rifle squad has a squad leader, two fire teams, and a helicopter crew. The fire support squad contains a squad leader, a machinegun team, a rocket team, and a helicopter crew. Their mission is to conduct dismounted scouting and patrolling and, when required, to close with and destroy the enemy. The platoon has four organic light cargo helicopters, each armed with .30 caliber or 7.62mm machineguns.

The Aero-Weapons Platoon consists of two rocket sections, each with two light cargo helicopters. The helicopters are heavily armed with rockets and machineguns. Their mission is to support the troop with air-to-ground fire.

A service platoon provides the necessary personnel and equipment to accomplish maintenance, resupply, and medical functions.

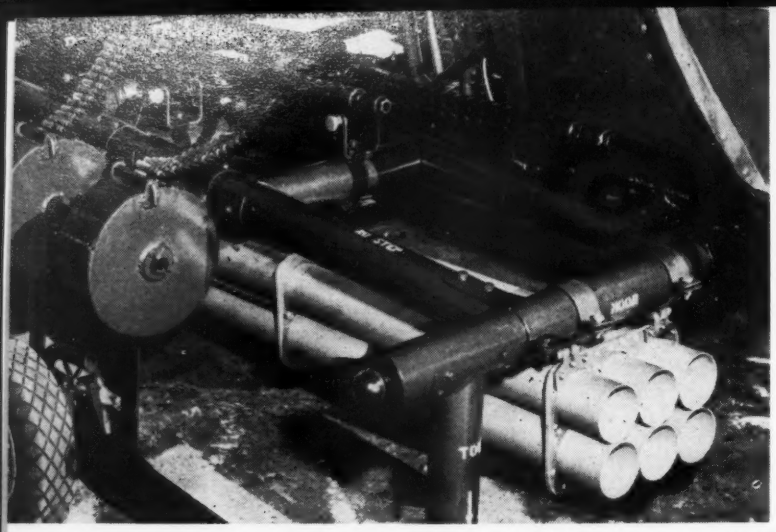
HELICOPTER ARMAMENT

The weapons kits described are those in current use at Fort Rucker. They have been built to test the feasibility of arming helicopters, to aid in developing tactics and doctrine, to train pilots in techniques of gunnery, and to serve as test beds for engineering and troop tests.

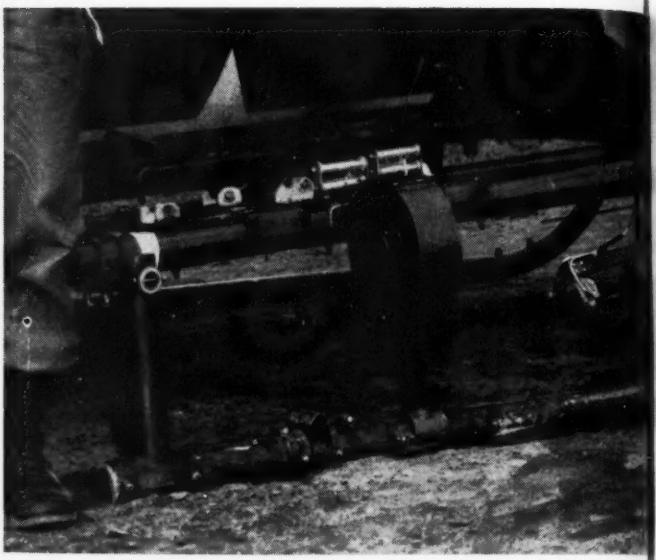
Several weapons systems specifically designed for helicopters are under development by industry. As these kits are completed and tested they will be added to the ACR inventory.

Following are brief descriptions of weapons kits — all designed and manufactured by 8305th ACR Company, Fort Rucker. The weapons and equipment pictured on the H-13E helicopter can be modified to fit the H-13H.

Development of H-13 Armament by ACR Co., USAAVNS

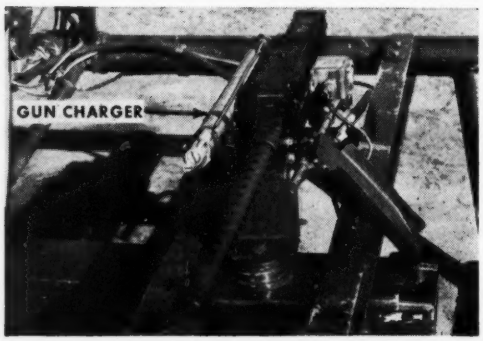


Pictured above and right are two of the many early experiments of ACR in the evolution of H-13 helicopter armament. Above are two aerial .30 caliber machineguns mounted above a 2.75 rocket launcher. This proved too heavy and cumbersome, so ACR tried the single gun without the rockets, shown at the right. Both kits are on uncushioned mounts which produced excessive vibration and jarred equipment loose on the aircraft.



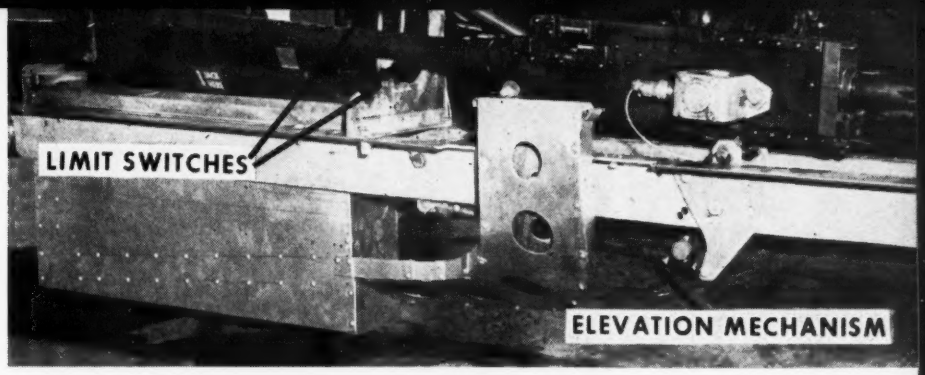
Left: the first experimental production model of an aerial .30 caliber gun on a cushioned mount (KX-13-A1). Vibration was taken up by absorbers, and ACR switched its efforts to this design. Some of these kits are still in use but are considered obsolete. These kits are not interchangeable from one aircraft to another. Note the new type of ammo box as compared to the types in the pictures above.

Right: the second cushion-mount kit (KX-13-A1-1) developed. It has a charging device for the machinegun (arrow) and various safety features. This kit now can be produced and mounted on all H-13 helicopters. Weapons: two .30 caliber aerial machineguns. Firing: 1,200 rounds per minute per gun. Capacity: 500 rounds per gun.



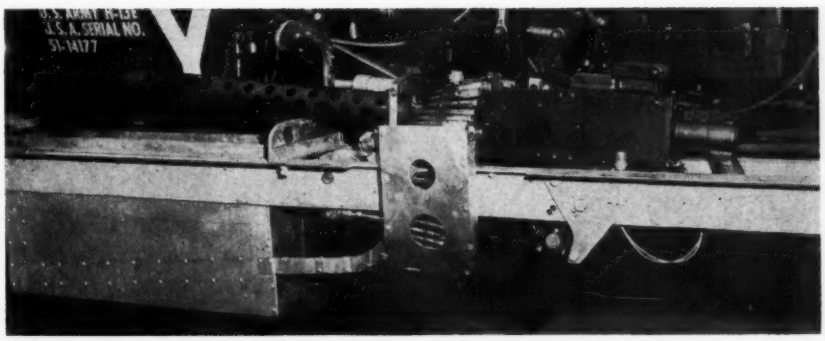
The New Aluminum Kit Mounts a Variety of Machineguns

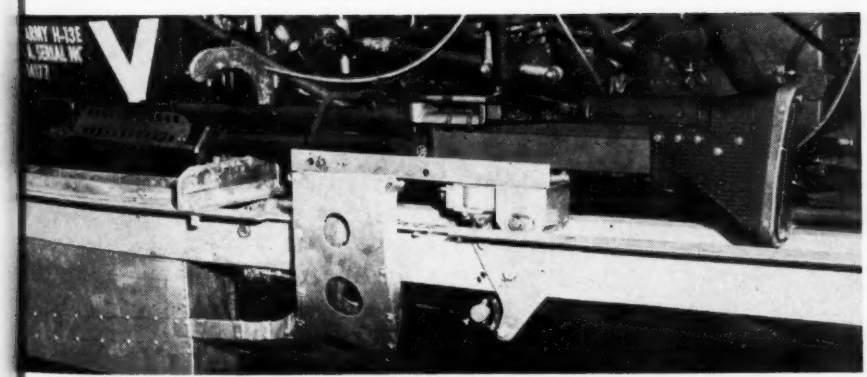
- Aerial .30 Cal
- M37 Tank Gun
- M60 NATO Gun

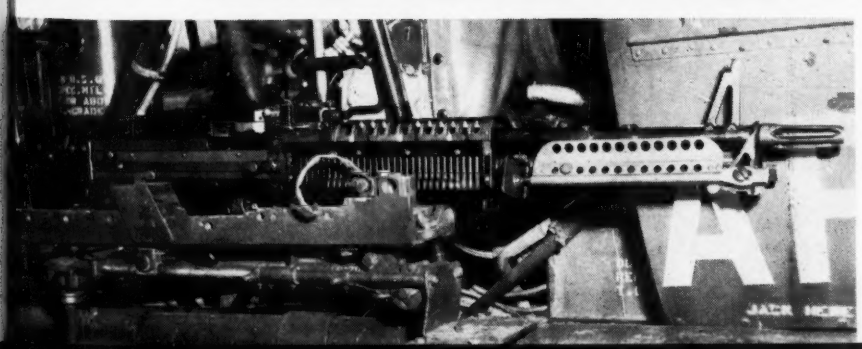


Pictured above is the latest suppressive fire weapon kit (KX-13-A1-2) which is still being developed. This aluminum, interchangeable kit is able to mount any one of three different guns used in the field. (The recoil system can be adapted to mount any machinegun used today.) The ammo can at its new location (lower front) is larger and streamlined to reduce wind drag. Other features include cockpit controlled elevation mechanism plus limit switches (arrows). The kit weighs much less than previous ones. Weapons: aerial .30 caliber (shown here); M60 7.63mm NATO gun, lower left; M37 .30 caliber tank gun, below. Rate of fire (each gun): M60, 650 rounds per minute; 30 caliber aerial guns, 1,200 rounds per minute; M37, 500 rounds per minute. Capacity: 650 rounds.

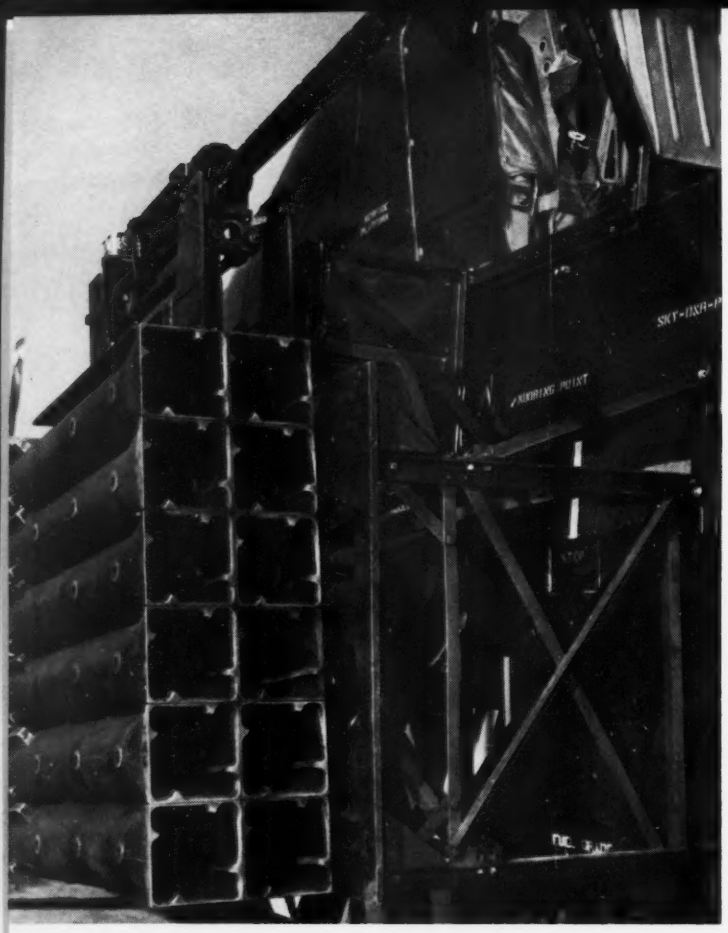
Right: the M37, .30 caliber tank gun mounted on the new aluminum kit. ACR currently is working on improvements for the firing mechanism and electrical system. ACR says this mount is too heavy and plans to reduce the weight with a refined elevating mechanism. In this picture the ammo can has not been moved to the rear. It must be located about two inches further back to fire properly.



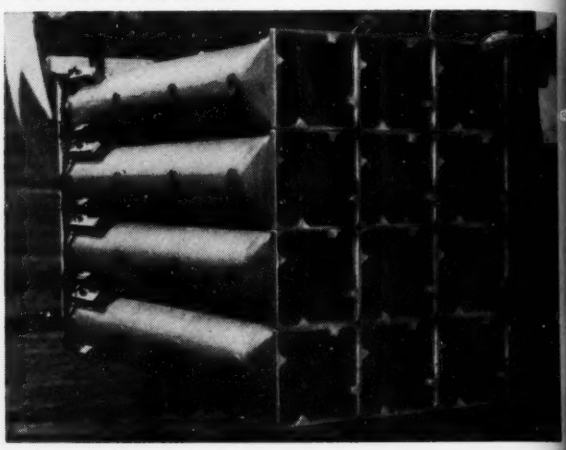




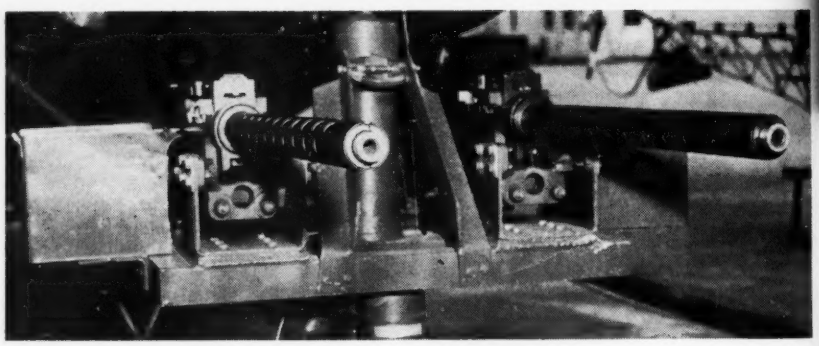
Upper left: the NATO, M60 gun mounted on the newest (KX-13-A1-2) kit. This weapon originally was mounted as shown, lower left, but proved too heavy and bulky. Some improvements are being made on the firing mechanism on the aluminum kit. The NATO gun on the aluminum kit, like the M37, can be removed in about five minutes and fired by hand. The ammo can in picture at upper left should be moved back about 6 inches for proper firing.

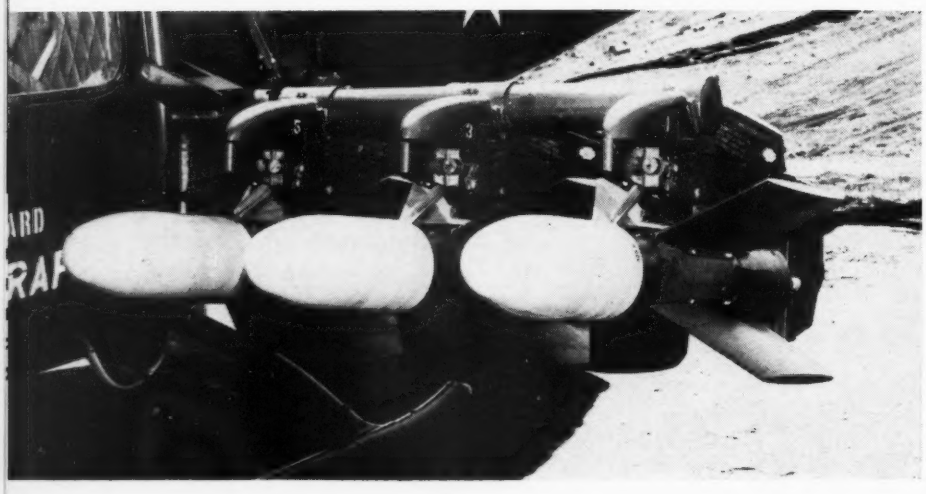


Left and below: these pictures illustrate 4.5-inch rocket launchers on the H-34 and H-21 respectively. The tubes are mounted in vertical columns on heavy aluminum plates. Firing is controlled by the aviator, either in pairs or ripples of pairs. Other kits being built by ACR are similar to the one pictured here, but are closer to the helicopter's center of gravity. The rockets fire at a rate of four per second and gain a velocity of 1,050 feet per second. Each contains five pounds of TNT and has a maximum range of 9,300 yards. ACR also is working on an automatic firing system for the launchers.



Right: two .50 caliber machineguns on the H-21. A recoil mechanism from an M3 AA mount is incorporated. The machineguns are so adjusted that they will have the same point of impact as the rockets at 1,000 yards. They fire at a rate of 1,600 rounds per minute and have a capacity of 105 rounds per gun. A mark-8 sight is used and tracers mark the target for the rockets.





Left: the HU-1A is shown with a brace of SS-11 solid propellant missiles. The missiles are directed to their targets by means of electrical impulses transmitted through trailing wires. The SS-11 weighs 63 pounds and is 46 inches wide. It has a range of slightly over 2 miles and is capable of defeating any armored vehicle known today.

A "missile-air offensive fire unit," part o an "Airtillery Support Group," shown in firin position. The weapons carrier is unique in tha a complete firing cycle may be accomplishe from the interior of the vehicle, thus allowin the carrier to move into an area, engage a ta get, and withdraw in a matter of 3 to 4 minute

Self-Propelled Airtillery

Lieutenant Colonel James D. Neumann, Inf

MUCH HAS BEEN written and said about the need for increased firepower and greater mobility, if we are to survive in any future type of warfare. The need for new aerial vehicles to support the Infantry-Armor-Artillery team in accomplishing these objectives is therefore apparent to the members of our Army and some of the more farsighted members of Congress.

Tremendous advances have been made during the past decade in Army Aviation. New equipment, such as the Iroquois, Caribou, and Mohawk, will soon find its way through our maze of supply channels and will finally be issued to our combat forces on a world-wide basis. Sophisticated Navaid "black boxes" are being developed by industry and the technical services which should give our aircraft an around-the-clock, all weather capability to support our combat forces in the forward areas. Surface

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Colonel Neumann is deputy director of the Combat Developments Office, USAAVNS, Fort Rucker. He is dual rated.

bound equipment is being designed and developed concurrently with the development of aircraft to ensure compatibility when the two meet at the loading zone.

In spite of these advances, the delivery of accurate and timely fire upon an enemy target stands as a constant reminder that it alone must precede any victory, whether it be on land, sea, or in the air. Actually, the combined efforts of our entire Army establishment are geared to the successful movement of the infantryman and his weapons system on the battlefield. Although important, all other things are secondary in nature.

To assist the infantryman in the accomplishment of his vital mission, I believe that offensive fire support (not suppressive) by low performance aerial weapons systems is a must. Another requirement is the integration of aerial units into the combat elements of the Infantry battle group, the combat command of the Armored Division, and the Artillery battalion if we are to achieve the necessary battlefield mobility so vital to success in any future area of conflict.

Our Army has a 24-hour-a-day nuclear capability with the 280mm gun, the 782mm Honest John ballistic rocket (30 mi range) and the 380mm Little John rocket (20 mi range) which may be moved into position by helicopter and fired in minutes. The heliborne Little John is recognized as a significant step in the right direction. However, a period of 12 minutes elapses from the time the aircraft lands until the Little John is fired and the launcher reloaded into the helicopter. The greater portion of this time is utilized in unloading, placing the weapon into firing position, and reloading the launcher into the helicopter after firing. The gathering of necessary firing data and the actual sighting of the launcher utilizes but one-third of the total time required. This appears to be a most significant accomplishment until you compare it with self-propelled artillery as far back as the early stages of World War II. It was not unusual at all for a SP artillery unit to be moving along a dusty road and within 5 to 10 minutes be firing on an enemy target some 5,000 to 8,000 yards away.

The most significant advantage of SP artillery is its ability to move rapidly and to be employed in a relatively short period of time as compared with other means. The trend in Army Aviation seems to be away from the special purpose vehicle. However, in my opinion, and from what I have read about the future extended battle area, there appears to be a definite requirement for an aerial vehicle with a special offensive function (a machine that can fight and be maintained in the forward battle area).

The optimum equipment, of course, would be a weapons system which is designed and developed concurrently with its air carrier. For the immediate future perhaps the answer should be an existing weapons system with an aerial vehicle designed around it. The blast, smoke, dust, and flash caused by a recoilless type fractional yield nuclear carrier, or the firing of a more conventional weapon for that matter, will certainly draw counterfire within a matter of minutes. Therefore, the ability to move into an area, land, fire, and move — all in a matter of 3 to 4 minutes—not only seems to be highly desirable but a prerequisite to survival.

The term, "Shoot and Scoot," as used by our artillery rocket launcher teams in World War II seems to designate the present requirement.

A step in the right direction — the HU-1 armed with the SS-11 anti-tank guided missile system.

CAN YOU TRUST YOURSELF?

It Couldn't Be Wrong! But It Was. Transfer Effect Can Be Deadly

Brigadier General Carl I. Hutton, USA

IT WAS a black night. Mine was the only airplane in the pattern and I was shooting landings — not touch and go but turn and taxi back. On downwind opposite the touchdown spot, I put on carburetor heat, throttled back, slowed the airspeed with a touch of back pressure and nudged the trim. Holding about 70, I turned base and put on 30° flaps. I turned final and reduced throttle to 1500 rpm. Controlling rate of descent with power, I aimed for the threshold and toggled on the landing light. Once over the lights, I began rounding out, easing off power and losing airspeed. The machine touched down with a satisfying bump and I held it straight through the landing roll. I braked it gently to a stop and toggled off the landing light, raised the flaps, executed a 180, and taxied back to the end of the runway.

There, after another 180, I reset the trim, put on 30° flaps, pushed the carburetor heat control to Ram, turned on the landing light, opened the throttle, and executed a normal takeoff. After the climb was established, I turned the landing light off, reduced throttle to 2300, and gently raised the flaps. I turned left, turned left again, and repeated the process.

This had been going on for an hour or so while I was having a contest with myself to see which circuit would be flown most precisely. By agreement with the tower, I was monitoring the frequency but not call-

General Hutton is Director of Training, Federal Aviation Agency, Washington, D. C.

ing for landing or takeoff clearances.

After one landing in the series, I turned off the landing light, taxied back to the end of the runway, lined up, pushed the carburetor heat to Ram, turned on the landing light, **raised the flaps,** and executed a takeoff.

There is a medical name for this phenomenon—transfer effect. When a pilot repeats again and again the 30 or 40 actions involved in shooting landings, the rhythm or monotony becomes almost hypnotic. There was something to be done to the flaps just before takeoff, but there was not the slightest awareness that what was done was the reverse of what should have been done. In the case described, I was so unaware of any change in the sequence that it was with a chilly uncomprehending shock that my left hand sought the flap handle after the takeoff. I even believe I momentarily started to put on flaps because it was time to do something about the flaps.

It couldn't be wrong. But it was.

If you think it couldn't happen to you, you may be right. I know it can happen to me because it did. I also know that if the gear on this airplane had not been down and welded, the transfer effect could just as well have happened with the gear control lever, and I could have landed wheels up. There would have been no excuse — just plain stupid pilot error.

Before saying to yourself that it could not happen to you, consider the evidence of this and other psychological traps. There is ample reason to believe that many mental effects are powerful enough to deceive two pilots in the cockpit. An extremely well qualified instructor pilot was checking out a well qualified pilot in the L-23. Both pilots were known to be careful and competent. Yet, on final, witnesses saw the gear come up and the airplane belly landed on the runway. There was no question of negligence or incompetence here.

Take another example. This was the case in which the three-man crew of a DC-6 airliner apparently experienced the acceleration type of vertigo on a night takeoff and flew right back into the ground after a flight of less than 45 seconds. The finding in this case said that the experienced pilots "ought to have known" about the phenomenon, and should have been on guard against it.

And another example. An airliner was on final approach with the gear up. The control tower operator had to repeat his warning that the gear was not down several times before he could get through the psychological block to the pilot and copilot. The pilot later, and sheepishly, said that he was busy watching other traffic. His statement was undoubtedly true at the time he was sequencing into the pattern; but it is obviously not true of the time the airplane was on final. There is no other traffic on final to distract the pilot and copilot and to prevent their hearing and understanding the tower's warnings.

The difficulty, from the safety point of view, with these psychological phenomena is that they cannot now be simulated in training. When a pilot encounters them the first time, it is a real situation. He may be lucky, as I was, and undergo the experience under conditions which bring no harm. He may be unlucky and experience embarrassing results, or worse.

How does a pilot protect himself from failings of the human mind which are genuine and positive? Unfortunately, in my opinion, past findings of pilot error in such cases have resulted in a failure of research to come to grips with the problem. If an accident is attributed to pilot error, there appears to be no necessity to do any research.

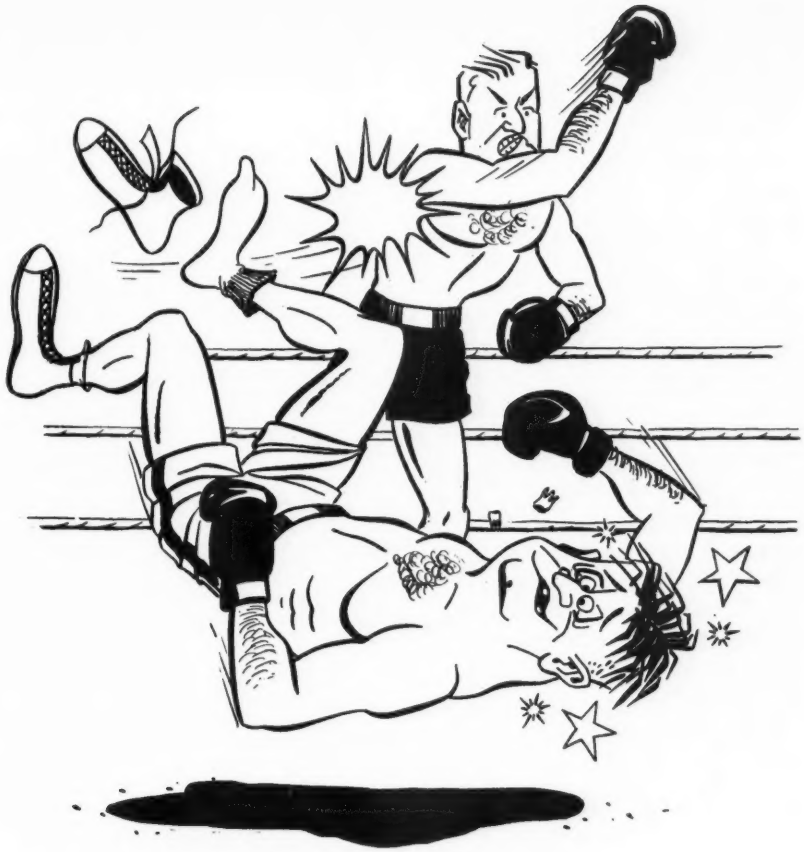
Here is an illustration of my point from common aviation experience. Suppose that pilots were given no instrument training but instead were told repeatedly that they would be subjected to vertigo if they lost visual reference. This would not keep them from getting vertigo. Vertigo is overcome by training, but there is no method of training to overcome many other psychological and physical effects.

The pilot is on his own. He must experiment with his own reactions and he must analyze those little occurrences which happen to everybody. These are the occasions when a wrong button is pushed, or when a hand goes instinctively to the wrong location, or when a lever is moved in the wrong direction.

You must try to understand yourself to avoid being trapped. It will help if you try to understand the mistakes of others. Avoid the habit of scornfully attributing other pilots' accidents to pilot error without careful analysis. You may learn something which will save you trouble.

Above all, you should understand that these phenomena are just as real as a stomachache, and they can happen to anybody.

SUDDENLY



"The approach was **normal** and the aircraft touched down in **normal** 3-point attitude, rolling straight down the runway. S U D D E N L Y, it ground-looped. . . ."

"I made a **normal** approach to the barrier, cleared the trees and started a **normal** roundout. SUDDENLY, the bottom fell out and the aircraft landed so hard the right gear failed. . . ."

"The p i l o t completed a **normal** preflight, started the engine and taxied out. He completed a **n o r m a l** runup and made a **normal** takeoff. S U D D E N L Y, the engine stopped. . . ."

"I was flying VFR. SUDDENLY, the aircraft entered a cloud and I was forced to go on instruments. . . ."

"I was making a **normal** approach to a pinnacle. SUDDENLY, the aircraft began to sink, even though I applied full power. . . ."

These poor fliers just never had a chance. Everything was going along **normally**, then bang, SUDDENLY it happened. Ever read any pilots' statements in accident reports? The majority are invariably similar. Whatever got them into trouble always happened suddenly. And who's to say they're not right? Certainly it must have appeared SUDDENLY to them.

Now let's go back and see what really happened in each of these accidents.

The Bird Dog pilot's approach appeared normal to him, although he had lined up for the center of the runway and drifted to the left side by the time he started his roundout. The aircraft appeared to roll straight after touchdown, but he had landed with drift and a gradual turn into the light crosswind began immediately. The pilot only recognized trouble when the aircraft finally wound up into the ground loop.

This article was prepared by the United States Army Board for Aviation Accident Research.

Often, the lightest crosswind is more difficult to judge and correct for than a strong, obvious crosswind.

The Beaver pilot made what he thought was a normal approach, but in reality he had constantly increased his pitch attitude to the point that the aircraft was ready to stall when he applied back pressure to round out. The pilot centered his attention on the tree barriers so hard throughout the approach that he failed to monitor the aircraft's attitude. True, what he saw did appear normal. Trouble was, he didn't divide his attention enough to see the abnormal.

To another Bird Dog pilot, his preflight and runup did in truth appear normal. In fact, he even checked some items twice because he couldn't remember whether he had checked them previously. And why couldn't he remember whether he had checked them before? The poor guy had been on duty until 0200 hours the night before and began preparations for this flight at dawn. At some point between the runup and takeoff, he had inadvertently reached up and switched the fuel selector to the off position. The CO was amazed when the flight surgeon showed little surprise.

The Otter pilot tuned his ADF to the nearest commercial broadcasting station and cruised merrily along, listening to some fine jazz. Suddenly, he found himself on instruments. Of course the front he had to cross lay in such a manner that it and his flight path made a scissors, and the forecaster had advised that he keep his radio tuned to monitor weather broadcasts. But who likes to listen to weather broadcasts when Satchmo is on the horn with the Dixieland Five?

The Chickasaw pilot, his aircraft loaded to near gross weight for the density altitude, thought he was making a normal approach; it appeared that the aircraft suddenly began to sink. His reconnaissance had consisted of a 180° turn 500 feet above the pinnacle, so how could he be expected to know his approach was downwind?

When your ring opponent is flipping a series of left jabs, avoiding that gloved hand becomes the biggest thing in your world. In fact, you can think of nothing else—until his lethal right SUDDENLY explodes in your face and you wake up to wonder why that fool is standing over you and counting . . . 8! - 9! - 10!"

REARVIEW MIRRORS ON HELICOPTERS?

Installation of rearview mirrors on Army H-19 helicopters was declared not feasible after recent tests conducted by the Transportation Materiel Command at TATSA testing facilities at Fort Rucker, Ala.

Following many requests from aviators in the field, the mirrors were installed. The tests revealed that vibration was the main drawback. During flight, the mirror could not be focused on a selected point and would not reflect a clear image. It could not be located in a position where the aviator could fully use it while simultaneously maintaining aircraft instruments and control.

Glare from the sun or lighting devices offered no problem. The tests were conducted under normal day and night field operations and under all weather conditions, with the exception of Arctic. The opinion of the test aviators was that any advantage gained through utilization of the mirrow was negligible.

Requests for various modifications are not discouraged by Transportation Materiel Command. However, unauthorized field modifications should not be attempted without approval of command headquarters. Expenditure of maintenance funds for field modifications or field experiments will not be approved without proper authorization. These regulations are established to preclude a duplication of efforts in tests that may be in the process or may have been completed at other installations. Rearview mirrors currently are being tested on other helicopters.

Mr. Aviation Safety Officer

IT'S UP TO YOU

HOW WELL you do your job as an aviation safety officer depends on two things: your success in getting people to work **for** you and **with** you. Aircraft accident prevention is too big a job for any one man. Getting the job done depends on the help of others. Unless you have this help, your accident prevention program will probably wind up as just that — **YOURS** alone. You'll meet stiff resistance when you attempt to establish **your** program; make it **our** program and the battle is half won.

Any successful aircraft accident prevention program is built upon teamwork and those qualities of leadership which result in good and motivating relationships. There is no easy way to achieve this, but there are some well established guidelines which you can use to good advantage.

Leadership. Be friendly, cheerful, modest but confident, optimistic and tactful. Don't make the mistake of confusing popularity with leadership. Popularity is nice to have, but it doesn't always result in confidence and cooperation. An easy going, indulgent aviation safety officer may be popular, but he may not get the job done.

Compatibility. A special aspect of leadership is getting along with people. You should become acquainted with the people on your airfield and get to know them by name. Talk with them and establish yourself as a friend, not an inspector. People do not respond well to strangers, so you can't expect to sit in your office and gain the confidence of aviators and maintenance personnel. One aviation safety officer we know considers this important enough to spend half of every day circulating around the air-

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This article was prepared by the United States Army Board for Aviation Accident Research.

field. This officer has an intimate knowledge of every activity; he knows every person at the field. More important, he knows his visits are expected and welcomed.

Personal Competency. It is imperative that the aviation safety officer maintain and demonstrate his efficiency as an aviator. To be accepted by other aviators, to gain their confidence and respect, he must be one of them. At one unit, the aviation safety officer makes it a practice to fly with each aviator — not as a check pilot, but simply to learn and share their problems. This officer has little trouble gaining aviator support for his projects.

Teamwork. Aircraft accident prevention is not the result of what the aviation safety officer does. It is the result of what people do — commanders, aviators, maintenance personnel, weather forecasters, control tower operators, and the many other people who work directly or indirectly with aviation. Each of these persons needs a sense of his individual importance. He wants to know what is going on and how it affects him. He needs a sense of responsibility, a feeling that his work is important. The aviation safety officer who seeks ways to satisfy these needs has taken a major step toward developing teamwork.

Psychologists tell us that the desire to be an integral part of some social group is one of the basic urges of human nature. An individual derives personal strength from the feeling that others desire and need his presence, from the belief that his work is essential to the welfare of the group. He wants to belong to the group, but he doesn't want to lose his identity. Every person wants individual recognition. If this recognition comes from the group in which he seeks status, group ties become stronger and the individual's stature is enlarged.

Industry learned this lesson in human nature the expensive way. For years, industrial management issued directives on accident prevention. Supervisors and foremen enforced the directives, ordered the workmen to comply. Accidents continued to happen. It was impossible to issue enough directives to cover every possible accident hazard.

Industry learned that "drivership" was not a satisfactory way to achieve accident prevention. It found that people could only be motivated to do the right thing at the right time through leadership. It learned that workers had feelings which could be hurt, drives which could be frustrated. It learned that workers could produce more and have fewer accidents if they followed a plan of action which they had conceived or helped to formulate. This was a costly, but valuable, lesson for industry to learn. Once applied, accidents were reduced to a low level and worker morale and efficiency grew.

You, as an aviation safety officer, can benefit from this lesson. You can capitalize on the fundamentals of human nature: group acceptance and individual recognition. How? Get out and meet the people of your unit—encourage initiative, promote teamwork, recognize individuals for the contributions they make, set an example that will generate enthusiasm. If you can gain the confidence of the personnel in your unit, make them believe that you're trying to help them do a better job, the basic structure of an aircraft accident prevention program will be well established.

It's up to **YOU!**

DID YOU KNOW

Speed at takeoff equals stall speed plus 15 percent?
Landing speed of 10 percent excess equals 21 percent increase in landing distance?

Has your transmission been cut off lately? When changing frequencies remember to monitor first, transmit second. Courtesy is "sky-high."

Tangled Transmissions

"Bird Dog 878 taxiing to runway for takeoff."

"Cairns, 2394, radio check."

"Roger."

"202, L-20 on the —(squawk, break-in) — taxi takeoff."

"644, hold position."

"Cairns, this is Army 2104, 6 miles northwest for landing instructions."

"Army 2104 — (squawk, break-in) — Bird Dog 104, radio check."

These radio transmissions occurred recently at the Cairns control tower at the U. S. Army Air Field at Fort Rucker. Such needless radio checks and rude break-ins plague the controllers and make their highly sensitive jobs difficult to perform. Controllers at Cairns say that poor radio procedure and manners are the rule rather than the exception. How is tower etiquette at your field?

True, much of the poor radio discipline at Cairns is because of the many students enrolled in Fort Rucker's Army Aviation School. They are eager fledglings bent on doing the right thing, checking that radio — making that transmission — and doing it all as soon as possible. But, the so-called pros are also guilty.

The picture at Cairns may be more candid than at most Army Air Fields. However, the same situation exists anywhere and anytime an aviator presses the radio control button and blurts out his message before monitoring the frequency. He does not know if he is breaking in on another transmission — one that may be of vital importance. The careless aviator could cause an accident or cancel a one-shot, last-ditch hope of a stricken aircraft by blanking out a crucial transmission.

Air traffic in the United States continues to increase. Army Aviation contributes heavily to the rapid growth as is evidenced by the mushrooming training program at Fort Rucker.

Last year Cairns AAF handled 194,112 takeoffs and landings, including 10,051 by GCA, which compares favorably with some of the country's top commercial airports.

Overall traffic at Fort Rucker's three fixed fields and many practice strips in 1959 was a quarter of a million landings and takeoffs.

Such rapid growth adds to the "yak, yak" clutter on the frequencies. For instance, in a 30-minute period at Cairns recently there were 146 transmissions on one frequency. Of these 31 were broken-in on, sometimes by two or three aviators simultaneously. In another instance, the tower received 17 radio check requests in 20 minutes.

The professional type aviator eliminates needless chatter on the frequencies. He knows that an unnecessary radio check requires only a few seconds of his time, but that time combined with the many others multiplies fast on the controller's end. This cuts sharply into the overall efficiency of the tower.

Stop a moment and consider the responsibility on the controller's shoulders and the complex job he is performing for your safety. The following paragraphs taken from a recent **Flight Safety Foundation** bulletin illustrate this point.

"The complexities of air traffic control have grown progressively from the single airway in the low frequency spectrum into a multitude of electronic radio paths resembling a giant snow shoe. Only a short time ago, aircraft were cleared to one radio fix by a center and then handed off to a tower one at a time. Today there are as many as 15 different ways to be cleared into — or out of — a busy airport.

"Sometimes five different aircraft approach an airport at the same altitude from five different directions simultaneously— an unheard-of process 10 years ago. Radar has shortened separation unbelievably in the vicinity of major terminals; today airplanes whisk through space at three miles per minute with only three miles separation.

"Most of the finer points — if not all — of tower controlmanship must be learned by experience and careful guidance from a skilled controller, because the system as we know it today is something new. It has no parallel; there is no written description. Controllers of ten — or even five — years ago are so far behind the present-day giant that it is doubtful that they could ever catch up with the pounding pace in a busy tower or center. It is an endlessly changing, dynamic growth."

Highly important are the instructions an aviator must be given when the controller cannot okay an immediate approach clearance. You will real-

Continued on page 21

THE
U. S. ARMY
BOARD
FOR
AVIATION
ACCIDENT RESEARCH

TWX excerpts

H-37 CRASHED AND BURNED DURING RETURN FLIGHT TO HOME FIELD AT NIGHT. ALL 5 CREWMEMBERS ABOARD FATALLY INJURED. WEATHER AT TIME OF ACCIDENT WAS CEILING, MEASURED 400 FEET, OBSCURED AND RAGGED; VISIBILITY, 2 MILES.

H-34C BURNED. AIRCRAFT LANDED ON HELIPAD IN HIGH GRASS. GRASS CAUGHT FIRE. NO INJURIES.

U-1A LANDED IN RIVERBED BECAUSE OF LOW FUEL. IT TOUCHED DOWN AND ROLLED THROUGH THE STREAM, COLLAPSING THE RIGHT GEAR AND HITTING PROPELLER. AIRCRAFT STOPPED IN UPRIGHT POSITION, BURST INTO FLAMES AND WAS DESTROYED. NO INJURIES. SUSPECT FUEL LEAK AS CAUSE FOR LOW FUEL.

H-21C LEFT VERTICAL STABILIZER CAME OFF DURING NIGHT FLIGHT. PILOTS EXPERIENCED NO LOSS OF CONTROL AND WERE UNAWARE OF DAMAGE UNTIL COMPLETION OF FLIGHT. EVIDENCE OF METAL FATIGUE OF UPPER AND LOWER STABILIZER FITTINGS.

H-34C MAIN ROTOR BLADES DAMAGED BY CONTACT WITH WIRE DURING STEEP APPROACH TO CONFINED AREA. DARK WIRE AGAINST PINE-TREE BACKGROUND DIFFICULT TO SEE.

H-23D INSTRUCTOR PILOT HEARD LOUD NOISE FROM TRANSMISSION AREA. TACHOMETER NEEDLES SPLIT AND ENGINE RPM ACCELERATED TO 3800. IP COMPLETED SUCCESSFUL AUTOROTATIVE LANDING WITH NO FURTHER DAMAGE. SINGLE ROW SPRAG CLUTCH FAILED.

H-13E SKIDDED TO THE RIGHT DURING LANDING, AND MAIN ROTOR STRUCK GROUND. HELICOPTER CAME TO REST ON RIGHT SIDE. PILOT AND PASSENGER SUFFERED MINOR BRUISES. NO MALFUNCTION. WEATHER NOT A FACTOR.

L-19A TAXIING TO HANGAR FOR HIGH WIND ALERT WAS DIRECTED TO CROSS BEHIND C-124. THE GLOBEMASTER ENGINES WERE RUN UP AND L-19 WAS TIPPED OVER, DAMAGING LEFT WING AND ELEVATOR.

H-13H FELL THROUGH DURING FLARE FOR PRACTICE POWER RECOVERY AUTOROTATION. INSTRUCTOR PILOT AND PILOT SUFFERED MINOR BRUISES. AIRCRAFT DESTROYED.

L-19E THROTTLE RETARDED TO INITIATE SIMULATED BOMB RUN. WHEN THROTTLE WAS ADVANCED, MAXIMUM OF 1500 RPM AVAILABLE. PILOT MADE FORCED LANDING ON ROAD WITH NO DAMAGE TO AIRCRAFT. THROTTLE SHAFT NUT, NOT SAFETIED WITH COTTER PIN, CAME LOOSE.

H-13E MAIN ROTOR BLADES FLEXED DOWN INTO TAIL BOOM DURING SHUTDOWN IN GUSTY WINDS, CAUSING MAJOR DAMAGE TO TAIL BOOM AND ROTOR BLADES.

H-13H MAIN ROTOR BLADE DAMAGED WHEN ¼-TON VEHICLE WITH WHIP ANTENNA DROVE UNDER OUTER EDGE OF ROTOR DISC AFTER LANDING AT FIELD CP. MAIN ROTOR BLADE DAMAGED WHEN IT SEVERED THE ANTENNA.

H-13G STRUCK TREE DURING LANDING APPROACH TO UNLIGHTED FIELD AT NIGHT. PILOT SUFFERED MINOR SCRATCHES AND BRUISES. AIRCRAFT DESTROYED.

L-20A STRUCK RIDGE OF ICE ACROSS RUNWAY DURING LANDING ROLL. MAJOR DAMAGE TO PROPELLER AND RIGHT LANDING GEAR.

H-23B LOST TRANSITIONAL LIFT OVER RIVER FOLLOWING TAKEOFF AND PILOT

...ots from march and april

WAS UNABLE TO RETURN TO TAKEOFF POINT. AIRCRAFT LANDED ON CHUNK OF ICE IN RIVER. MINOR DAMAGE TO TAIL ROTOR BLADES DURING LANDING. AIRCRAFT FLOATED DOWN RIVER ON ICE, WAS TUMBLED INTO WATER BY TREE BRANCHES AND GROUND TO PIECES BY HUGE CHUNKS OF ICE. NO INJURIES. SUSPECT TAIL ROTOR BLADE FAILURE.

H-19D LANDING GEAR BROKEN DURING LANDING. OLEO COMPLETELY COMPRESSED, GIVING METAL TO METAL CONTACT. BOLT (P/N AN 24-24) HOLDING CAP ASSEMBLY AND CYLINDER ASSEMBLY TOGETHER FAILED UNDER SHEER LOADS.

H-13H DESTROYED DURING TAIL-LOW PRACTICE TOUCHDOWN AUTOROTATION. AIRCRAFT BOUNCED, ROLLED FORWARD AND MAIN ROTOR BLADES STRUCK GROUND. MINOR INJURIES TO INSTRUCTOR PILOT AND PILOT.

TL-19D ENGINE BEGAN MISSING DURING NIGHT FLIGHT. PILOT RECEIVED EMERGENCY LANDING CLEARANCE TO NEARBY AIRPORT AND COMPLETED SAFE LANDING. NO. 6 CYLINDER FAILED INTERNALLY, CAUSING EXTENSIVE DAMAGE TO PISTON AND COMBUSTION CHAMBER. CAUSE UNDETERMINED PENDING INVESTIGATION.

H-13H TAIL ROTOR BLADES STRUCK BUSH WHILE AIRCRAFT WAS HOVERING TO BACK BLOW A RANGE FIRE. MAJOR DAMAGE TO TAIL ROTOR BLADES.

H-21C FORWARD MAIN ROTOR BLADE DAMAGED WHEN EMPTY CANVAS CONTAINER WAS THROWN FROM FORWARD CARGO DOOR AND DRAWN THROUGH FORWARD ROTOR SYSTEM.

L-23D NOSE GEAR COLLAPSED DURING LANDING ROLL, CAUSING MAJOR DAMAGE TO PROPELLER, LANDING GEAR, FUSELAGE AND FLAP. NO INJURIES. CAUSE UNDETERMINED PENDING INVESTIGATION.

H-19D COMPLETED FORCED LANDING DUE TO INFLIGHT ENGINE FIRE. FIRE CONTINUED TO BURN AFTER LANDING AND MOST OF LOWER HALF OF FORWARD TWO-THIRDS OF AIRCRAFT DAMAGED. NO INJURIES. SUSPECT CYLINDER ASSEMBLY FAILURE.

H-21C SETTLED INTO RIVER DURING TAKEOFF FROM MOUNTAIN HELIPAD. DOWNDRAFTS AND GUSTY WINDS WERE FACTORS. ONE PASSENGER SUFFERED MINOR CUTS ON FACE FROM FLYING PLEXIGLASS. AIRCRAFT DESTROYED.

H-37A MAIN ROTOR BLADES AND TAIL ROTOR PYLON DAMAGED DURING SIMULATED SINGLE-ENGINE LANDING.

H-23D MAIN ROTOR BLADE TIPS DAMAGED BY CONTACT WITH TREE LIMBS DURING PINNACLE APPROACH. WEATHER NOT A FACTOR.

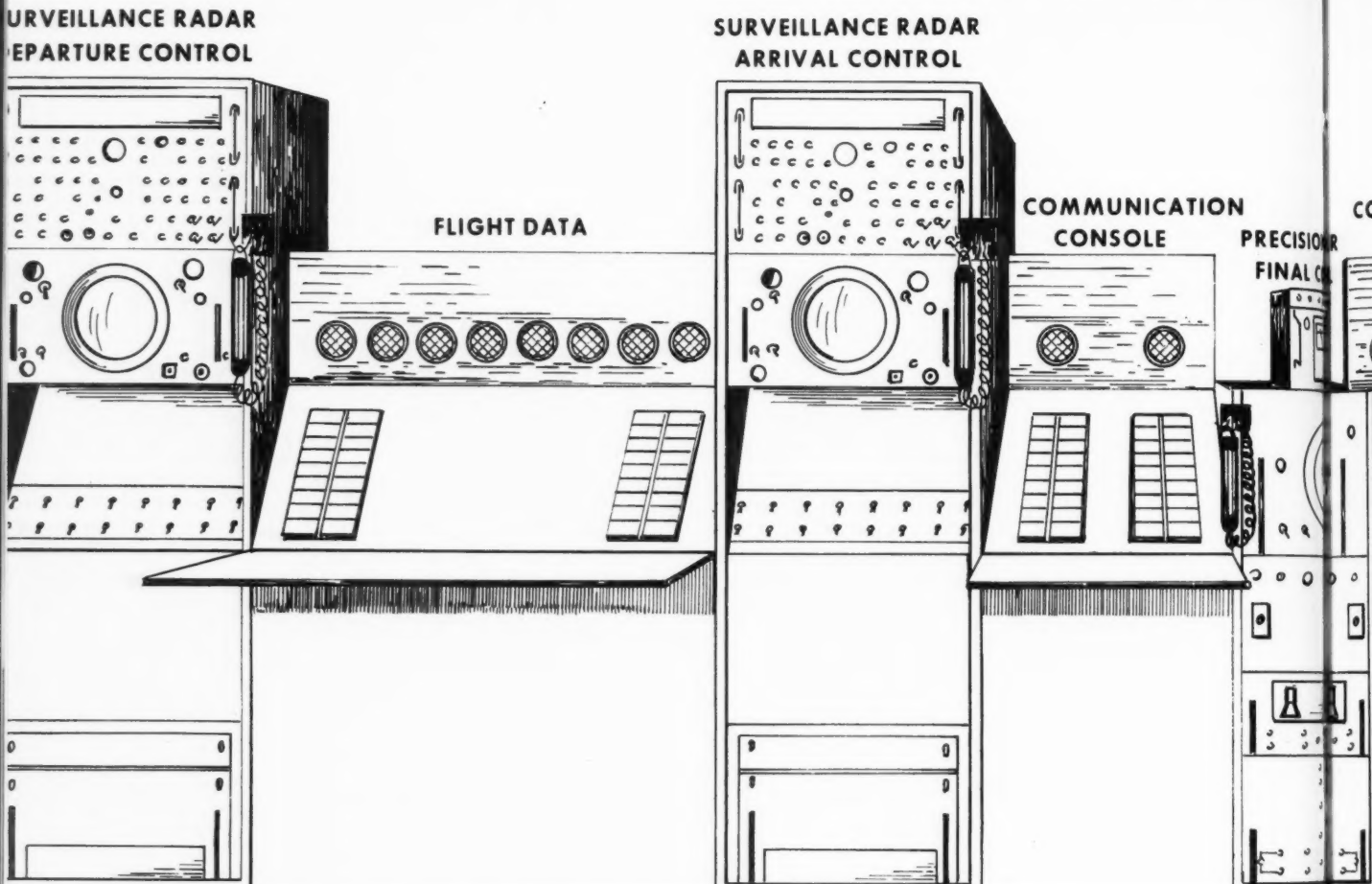
HU-1A REARVIEW MIRRORS WERE TORN LOOSE AND PILOT'S AND COPILOT'S LOWER WINDOWS BROKEN DURING LANDING BECAUSE OF CONTROL MALFUNCTION. SUDDEN PITCHING MOTION CAUSED DAMAGE WHILE AIRCRAFT WAS BEING SKIDDED TO LEVEL AREA. SUSPECT HYDRAULIC MALFUNCTION.

H-23C DESTROYED BY HARD CONTACT WITH GROUND. PILOT EXPERIENCED SETTLING WITH POWER IN UNSTABLE AIR CURRENTS OF MOUNTAINOUS TERRAIN. NO INJURIES.

H-13H STRUCK TELEPHONE WIRES DURING HOVER. MAJOR DAMAGE TO TAIL ROTOR, TAIL BOOM, BOOM EXTENSION, MAIN ROTOR BLADES AND SKIDS. NO INJURIES.

RAPC

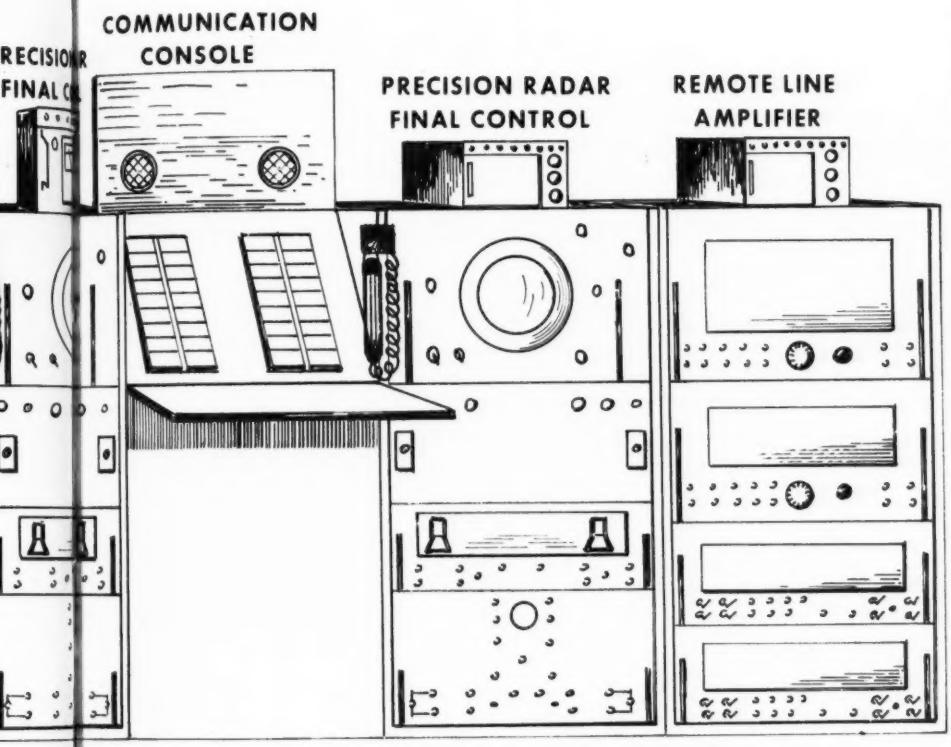
(AN/MPN-11 REMOTED)



ON 1 JUNE 1960, the addition of "Radar" to the title Cairns Approach Control, and the assumption of tower en route service responsibility by the Flight Facilities Branch will mark the accomplishment of another notable "first" in Army Aviation.

A year ago, at the outset of planning to establish the RAPCON service at Fort Rucker, the planners saw the immediate need for a central location and for cross-training of approach controllers and GCA operators. Cairns Approach Control is situated in the 125 foot control tower located on Cairns Army Air Field. The radarscope, which provide the heartbeat for any radar control facility, are located approximately 1 mile away, on the far east side of Cairns field. The only communications between the two is by radio, in-

CON



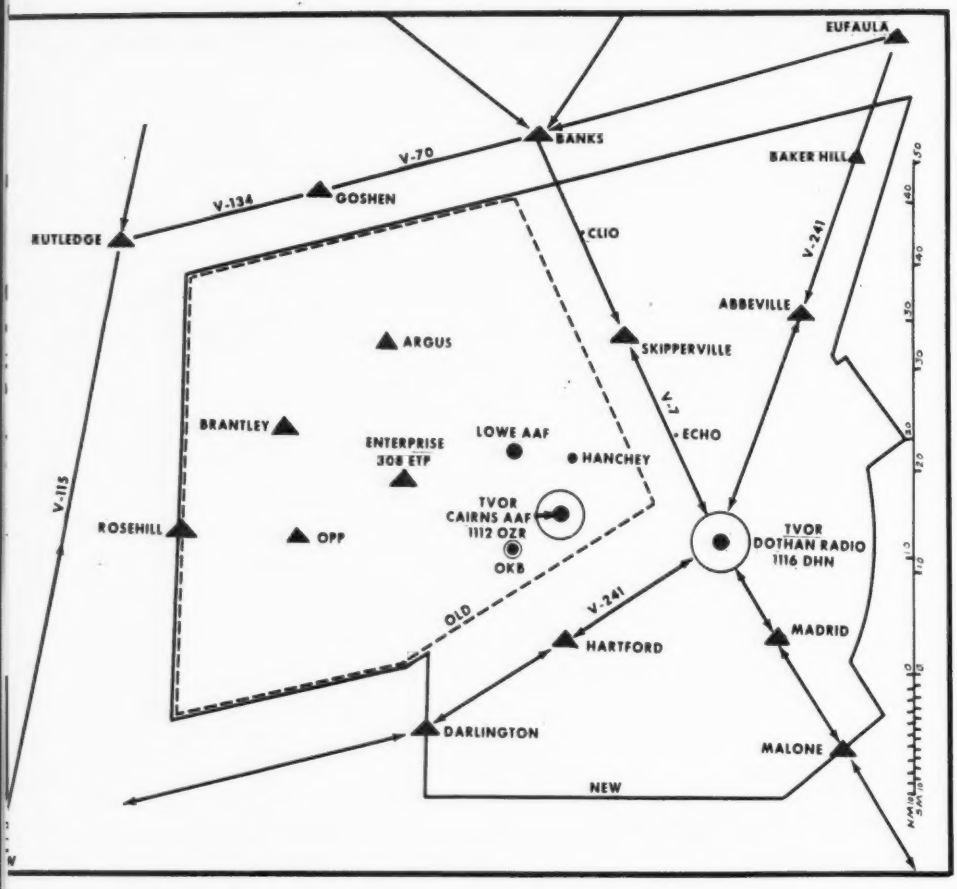
tercom, or TA-43 field phone.

To overcome this gap in communications and coordination, a room on the first floor of the Cairns Operations Building was selected to be the "Radar Room." Airfield Command (then Airfield Unit) planners, the Center Signal Officer, and the Center Engineer made plans to remotely locate the radarscopes and controls in that room. The transmitter and antenna of the Ground Controlled Approach mobile unit, MPN-11B (GCA) were left at the approach end of Runway 24.

Implementation of this innovation in Fort Rucker Air Traffic Control was not a simple task. Never before had this equipment been strewn about in such a way. Gilfillan Bros., Inc., fabricated the required special fittings and equipment on a one-time basis. Two runways had to be cut and conduits laid under them to accommodate approximately 4 miles of special shielded cable. One concrete block wall of the selected radar room was completely removed and a false wall and ceiling installed over the entire room.

All of the operating position consoles were designed locally by the Gilfillan technical representative and were manufactured by the Center Signal section. This will include an elaborately complicated communications system that is being fabricated by the Signal Maintenance Section. This type of RAPCON installation would cost more than one-half million dollars if done by an industrial electronic contractor. However, through extensive, cooperative use of the ingenuity, skill, and technical know-how of civilian and military technicians at Fort Rucker, a very professional installation has been made. For approximately one-twentieth of the quoted cost Cairns Approach Control will possess all the radar capabilities of comparable agencies (FAA, USAF, and USN).

A RAPCON service could not be economically operated if the approach controllers and the radar operators were not one and the same. For the past six months, Airfield Command has been conducting a program of cross-training the traffic controllers to be radar traffic controllers; and the radar operators who previously conducted



Dotted line encloses present Fort Rucker approach control area. Solid line, plus dotted line, encloses RAPCON area.

only GCAs have been trained to control traffic.

The RAPCON unit will control arriving and departing aircraft at Cairns AAF, Hanchey Army Heliport, and Dothan Municipal. Aircraft departing these fields will be controlled by radar until positioned on Federal Airways at their assigned altitudes. This will expedite the movement of all air traffic in this area, as the required separation between aircraft is reduced when radar is used for positive control.

This article was prepared by the Flight Facilities Branch, Cairns AAF Command, Fort Rucker.

In addition to furnishing all the IFR separation and traffic control normally expected, Cairns RAPCON will provide traffic advisory service for all aircraft operating into and through the control area under VFR. Cairns RAPCON will also furnish weather radar advisory service. Present capability will be sufficient to satisfy all requirements for weather advisory service.

In addition to assuming a RAPCON status, Cairns Approach Control assumes the responsibility of tower en route service for the Cairns control area. This means that Cairns Approach Control will fully control and coordinate all air traffic movement on Federal Airways and that airspace not on airways from an altitude of 4,000 feet MSL down to 700 feet MSL in its control area (see map).

All IFR flights at 4,000 feet or below on flight plans will be handed off at the respective clearance limits to Cairns approach. Two final radar controllers enable the RAPCON to have two aircraft on GCA simultaneously in different stages of approach.

This tower en route service will include approach control authority and responsibility for Dothan Munipical Airport, to be effected by peripheral radios remoted to that airfield. It is anticipated that Dothan's monthly traffic count will exceed 100 commercial carrier operations and several hundred general aviation operations.

The Cairns RAPCON, being the controlling agency for all "fly through" traffic, will necessarily log each contact with those nonstop flights through the control area as an IFR or VFR operation. This traffic count, when added to the local area traffic count and those itinerant flights terminating at Cairns, Hanchey or Dothan should add up to an extremely impressive total. Cairns Tower and Approach Control already has an annual traffic count in excess of 200,000 total operations and is technically termed a "highly complex operation." It is expected to increase its operational count by a large percentage, making it one of the busiest terminal areas in the United States.

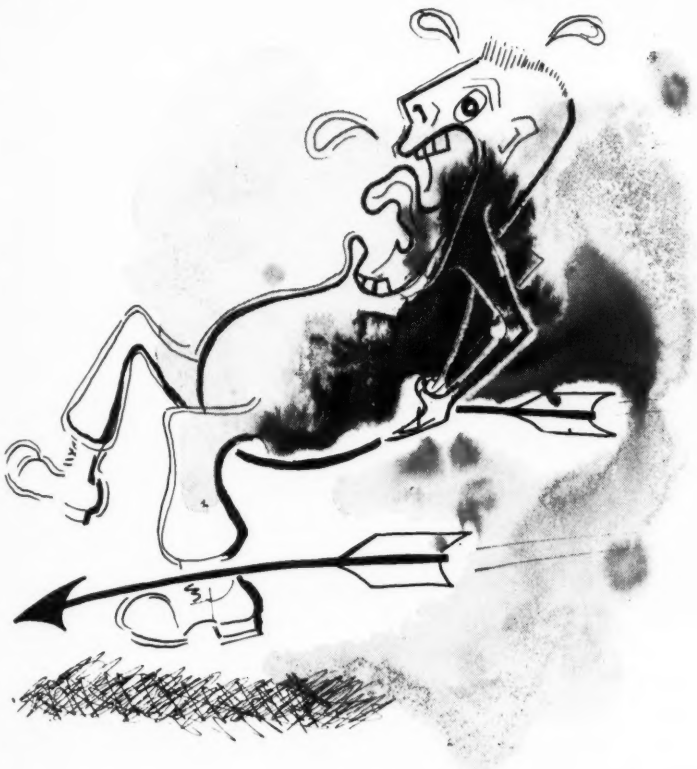
Continued from page 15

ize the seriousness of a breach in radio etiquette if you are the one who misses delaying-action instructions because someone broke in and drowned out the controller's voice.

Points of conflict must be spotted by the controller several minutes before they occur. He understands these situations and knows how to correct them quickly. However, he cannot anticipate needless transmissions and break-ins that cause delays. An altitude over a certain fix, if neglected for any length of time, can tie up the whole zone and back up or delay traffic for 500 miles in all directions.

The Army Aviator is not a true professional until he understands the problems of the controllers and makes a sincere effort to cooperate with them. Let's monitor the frequency before using it, and make transmissions clear and brief as possible. Don't lose your temper with the controller — remember he's there to help you, and will — if you let him.

Did We Hit the Target or Miss You Completely



Did one of our authors wound you deeply by failing to give you as complete a picture of the subject as you desired? We'll never know unless you write.

If the subject you want covered wasn't in this issue, write us and we'll do our best to see that it is included in a future issue.

Do you have your own ideas on how Army Aviation should be employed on the future battlefield? Does your unit have a new or better way of doing a particular job? Write and let us know what **you** think. As a professional in the field of flight, the knowledge you have should be passed on to others.

If you want to write but don't have a topic, here are a few subjects to titillate your imagination:

Should Army Aviation adopt a standardization system and, if so, how should it be implemented and maintained?

How can the Flight Safety Program be improved?

Aviation Company Operations on the Atomic Battlefield.

Army Aviation in Support of Airborne Operations.

Airmobile Operations at Night.

CAN THE GROUND LOOP BE WHIPPED?

Lieutenant Colonel Jean L. Chase

WHY HAVE SOME pilots flown the L-19 for years, both tactically and administratively, without experiencing ground loops, while other pilots have ground loops under ideal conditions? Did pilots who received flight training prior to the adoption of the L-19 learn something that is not taught now?

I think the instruction received by the pilot today is more complex and probably of a higher quality than the instruction received during the 1942-45 period. However, the application of that instruction is not always continued in the unit training program today, nor required as an operational necessity. The Cub pilot was taught road landing technique as a student. Directional control was extremely important in this maneuver. After graduation he found that Engineer support was nonexistent, and that the only landing areas available were roads or fields. Thus, he was forced continually to maintain proficiency in directional control.

Can we conclude that road landings are a possible key to the problem? Nearly every pilot who served in Europe or the Far East during WW2 has landed on a "one way elevated cart trail" with rice paddies or small fields on each side. Directional control was a must; the pilot had to master this or end up as a forward observer in a front-line foxhole.

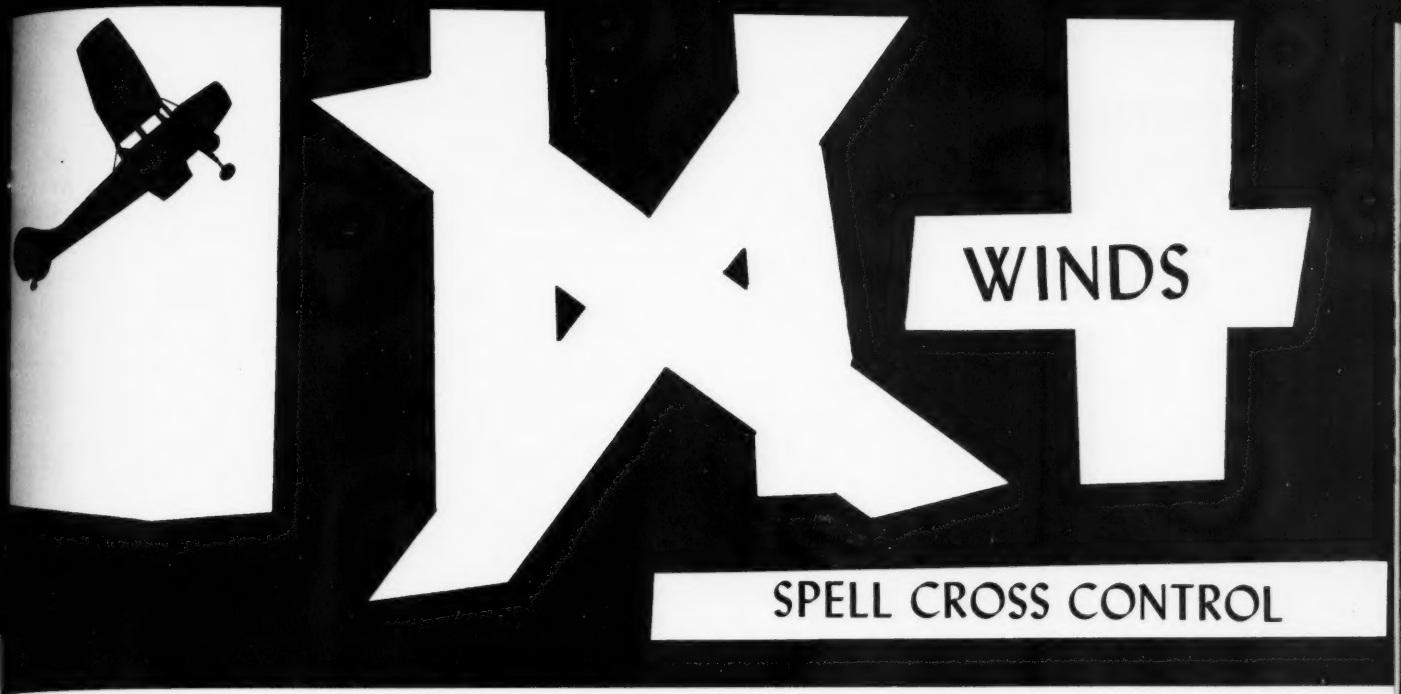
Road landings are still taught in flight training, but wide field strips and hard-surfaced airfields at most Army installations have made the daily requirement for absolute, instantaneous directional control on landing less important. A little variance in directional control is not of prime concern with spacious landing area; therefore, the pilot gradually becomes less alert.

It is not suggested that we revert to short narrow strips to maintain proficiency in directional control; but large doses of the techniques used in this type of flying should be continually inserted into our unit training program. You can't stop a ground loop; you must prevent it before it happens. The touchdown must be straight and clean, without drift or crab. If not, go around immediately, not a hundred feet down the runway. The stick must be all the way back. If you notice yourself relaxing the back pressure, it is a danger sign.

Practice until you can keep the path of the aircraft on an absolutely straight course down the centerline. The slightest deviation should be corrected quickly. Mark out road strips on practice landing areas to practice; then gradually reduce the width to approximately 18 inches wider than your gear. If you can stay within these boundaries, you have a fighting chance to avoid the ground loop.

To say that the ground loop can't be whipped is nonsense. There are far too many Army Aviators who have grown up with the L-19 and have never experienced the embarrassment of a ground loop. Practice to the point of perfection is the only answer.

Colonel Chase is Flight Safety Officer of Simmons Army Airfield Command, Fort Bragg, North Carolina.



Major Byron H. Brite, Arty

"AH, SWEET MYSTERY of flight, at last I've found you!" Isn't this our feeling once we have developed the special techniques and skill to face crosswinds with confidence? Loss of directional control resulting in bent airplanes — usually while landing — is hardly an economical maneuver, nor is it one from which satisfaction and pride can be derived.

The functions of rudder, ailerons, elevator, tailwheel, and brakes must be considered in the crosswind perspective in terms of what we are trying to do. Each has its place in the sequence of events for a light conventional airplane.

To hold the tail and the windward wing down while taxiing a light airplane into a direct or quartering crosswind, the stick is held back and toward the windward wing. The windward aileron serves as a spoiler to reduce the lift on the windward wing, while the downwind aileron serves to increase drag to help overcome the weathervaning tendency of the airplane.

To hold the tail and the wings down while taxiing a light airplane downwind, the stick is held forward and in the downwind direction so that the wind pushes downward on the elevator and the windward aileron. The need for brakes is minimized if taxiing can be along a line parallel to the wind.

Now for the takeoff. Use flaps? Yes; we are in the middle of a short strip. Maximum performance? No; the wind is fairly strong and quartering from the right, and the barrier is no problem for this practice field. The first objective is to **roll straight,** primarily on the right wheel until a good flying speed is reached. We know we do not want to take off three-point. And if you want to take off on both main wheels, you'll have to talk to someone else. For my money, you can't do it without starting toward the boondocks, or really confusing the airplane. So, it's from the right wheel for the takeoff. When the tailwheel leaves the ground is dependent upon the wind velocity-power-weight relationship. Essentially, the airplane must be caused to roll straight until flying speed is attained. This means correction from d r i f t by lowering the windward w i n g and rolling straight, by the smooth use of sufficient opposite rudder and cautious braking.

With the tailwheel straight, feet on the brakes until we start rolling, stick to the right to start the right wing down and stick back far enough to hold the steerable tailwheel down initially, left foot alerted to start coming in with left rudder (maybe a little left brake, too) as she starts to weathervane, we push the throttle steadily and smoothly as we release the brakes. Though the airplane is normally a lady, who reacts most favorably to the gentle and

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Takeoff from right wheel

caressing touch, today we are alert for her idiosyncrasies and perhaps a bad disposition. Thus we are prepared to use smooth but firm control to show her that we wear the pants in this family.

As she starts to roll, we watch her movements carefully, add enough left rudder to keep her nose straight (no weathervaning today, but we don't kick the rudder either), and ease off from full right aileron as the left wing rises to let her ride on the right wheel. Now when did that tailwheel get off the ground? It must have been automatic as we picked up speed for rudder control instead of tailwheel control, because we know we held it down initially for steering. Actually, we allowed the tailwheel to rise as we felt rudder control become effective. Anyway, with this wind and a light load we roll only a short distance on the right wheel when, with a good flying speed, she breaks ground, then we level the wings and set up the climbing crab.

Easy? You bet; wish we could do it that way every time. We could have had trouble though if we had **kicked** the left brake then the right one abruptly, or if we had held full right aileron too long, causing overcorrection for drift to the point of contact of the right wing with the ground or of a premature climbing turn to the right. Overcontrol is like a woman with a new hat that got wet — to be avoided.

Since we had good luck with that takeoff, let's go practice a landing or so on a field strip. We know the importance of a good reconnaissance b e f o r e landing in a seldom-used strip. So having made a high and low reconnaissance, let's try a landing in this strip. With these gusts, our power approach and crab will require adjustments to maintain a straight track and the desired angle of descent. It looks like a good place for a downdraft on final because of that ridge on the windward side and parallel to the strip.

As we turn from base leg to final, we use a power approach for positive control and here we go. With a right wind, we are crabbing to the right, naturally. We allow a little extra clearance above that tree because of our suspicion. Woops! Down a little faster; good thing we allowed for that downdraft. Now a little before time to round out (how high or when is your personal choice), we shift from a crab to a slip before we round out. With the right aileron ready to adjust the lowered right wing, which corrects for drift, and the left rudder applied sufficiently to hold a straight approach, we are in business.

Our intention is to roll on that right wheel only long enough to dissipate airspeed to permit easing the tailwheel down (or we may land on the right wheel and the tailwheel), then to lower the left wheel to ground contact. We're a little above the strip, so we ease off power and ease back on the stick, still holding that right wing down and holding her straight with the left rudder. The right wheel touches. We roll a little to slow down, come back on the stick; the tailwheel is down then the left wheel is on. Simultaneously, as speed dissipates, the stick is moved full rearward and to the right for full aileron. Left rudder and brakes are used as necessary, but smoothly to maintain a straight roll. So, that's it. But it's never over until we're stopped and parked.

Any secret to the use of the rudder, ailerons, elevator, tailwheel, and brakes? None, except their application with the finesse of judicious authority expressed in proper timing, direction, and degree.

. . . touchdown on right wheel

AVIATION LEGÉRE de L'ARMÉE de TERRE

Major Hilaire Bethouart

SINCE MAN began to fight, opponents have always tried to learn what the other was doing. With this knowledge, they tried to be at the right place at the right time with a preponderance of force. Consequently, as soon as man was able to lift himself above the terrain in an airborne vehicle he began to consider the military application of this invention.

On April 2, 1794 the first Company of Aeronaut was created in the French Army under the command of Monsieur de Coutelle. Although they only had primitive balloons, these French Army aviators successfully developed their flying skill and were able to gather accurate information about the enemy. The development of balloons continued, but fixed wing aircraft, introduced at the start of the 20th century, quickly advanced the capabilities of observing enemy activities.

In 1939 the French Army created and equipped its first aerial observation unit with autogyros. The Artillery was the first branch to realize the possibilities of modern aircraft and the growing gap between the Air Force (trying to fly higher and faster) and the earth-bound requirements of the doughboy.

This unit was dissolved during the dark days of 1940. Later, in the North African campaign, the French Army artillery units received the American L-4 for artillery fire adjustment and observation.

Many years of war have been fought by the French Army since V-E day. The wars in Indochina and Algeria have factually demonstrated what may be expected from the flying machines of the Army. Experience gained from these two campaigns led to the expansion of Artillery Aviation units into the ALAT (Aviation Legere de L'Armee de Terre) which is similar to United States Army Aviation.

An army always tries to adjust its means to its missions. During the past 14 years the French Army has been involved in limited wars or guerilla warfare, which do not have the same characteristics as a general or nuclear conflict. Consequently, without ignoring the requirements for a modern war,

Alouette somewhere in Algeria — December 1958

Alouette used as a flying command post

H-21 company standing by

the ALAT has been adapted to the proper needs of the actual fight.

What have been the missions of ALAT in guerilla warfare?

The first (and for a long time the most important) mission assigned to French Army aviation was observation. The aerial observer occupies a unique physical position. He is able to see and understand enemy and friendly dispositions. Thus, he provides the command with instantaneous response to enemy movements.

In the jungles of Indochina and in the wild mountains of Algeria, the enemy is almost invisible to the doughboy. The observer in his L-19 is often the only one able to see what is going on. He must be versatile. As he searches for the enemy, he discloses an ambush, adjusts artillery fire, calls for Air Force fighters when necessary and marks their targets. Guerilla warfare is tough for the small units. Often isolated, they do not know when nor where the fight will explode about them. They must bear nearly all the burden of the conflict. To them, the aerial observer is of the utmost importance. He guides and supports them; he must be well aware of the ground maneuvers which may be attempted at any time; must redirect a company advancing on a wrong track; and establishes an aerial radio relay between two units if normal communications are impeded by the terrain. Whatever the difficulty, he informs the commanding officer of the operation; and if necessary, he leads the subordinate units towards the objective.

Aerial observation is a full-time job in guerilla warfare. For this reason the observer, although a pilot, seldom handles the stick when performing his mission. Flying in a narrow and high valley of Algeria requires all the attention of the pilot. Both pilot and observer must be alert to their own responsibilities when flying, whether it is in winter with its constantly strong winds or in summer with its hazardous flight path caused by heat and drought. This is especially true when flying close to the ground to identify a suspicious point.

The second mission of ALAT is the assault maneuver by helicopter. One of the characteristics of guerilla war is that you don't have a battle front, per se. You may have to face, at different places and occasionally at the same time, well-equipped rebel elements of various sizes which must be destroyed. These rebel troops

H-21 landing in mountains. Notice that only 1 wheel touches ground

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Major Bethouart is assigned as French Liaison Officer with the USAAVNS, Fort Rucker.

generally operate in high, broken mountainous areas. Tremendous stamina, mobility, and an intimate knowledge of the country are their chief assets.

Most of the time, "guerilleros" will only join battle when they are sure of withdrawal by night into an area unsuited for truck, armored car, or tank operations.

The European soldier wears himself out enveloping by classical means. However, the helicopter changes the picture . . . the advantages have been exchanged. When used with suppleness and speed, the transport helicopter allows a commander greater mobility than his opponent. The high cost of transport helicopters and the particular methods of combat in Algeria require certain rules of employment which may not be adaptable in another theater of operations.

The transport helicopter companies, fitted with H-21s and the French-built Alouettes, are often coupled with an infantry unit that is well trained and adapted to this kind of fighting. These units are usually airborne troops—paratroopers familiar with shock action. They are well-equipped with light and powerful armament, and radio sets. Commissioned and noncommissioned officers are numerous, and their basic training is adapted to use of helicopters.

When the same helicopter company works frequently with the same regiment, new and invisible bonds are cemented for the benefit of all. A mutual understanding and a commander experienced in employing helicopters is of the utmost benefit when the battle reaches its climax. Achievement of the objective will be accelerated in tremendous proportions because the commander may shrink his orders to a few simple words over the radio with the assurance that they will be understood. Since this method has been in use in Algeria, efficiency of the helicopter companies has been truly multiplied.

Armament fitting H-21 helicopter. Two rocket containers (each with 19 68mm rockets) mounted as shown in picture below. Four 7.62mm machineguns mounted on the front strut.

68mm rocket containers mounted on an H-21. The front wheel machinegun set shown here has been replaced by the one shown in picture above.

Tactical employment of DIH (Detachment d'Intervention d' Helicoptere) companies has been varied. After receiving intelligence information, DIH may be employed to envelop a suspicious area by helitransport in areas difficult to reach, engage in deception maneuvers or perform sallies to obtain or to confirm information. For maximum efficiency from these valuable units, helicopters in assault maneuvers are seldom used at the beginning of an action when information about the enemy is still vague.

Before utilizing his helicopters, the commander tries to verify and augment the infor-

Alouette with 2 containers of 36 37mm rockets each. Another version is fitted with 2 containers, carrying 18 27mm rockets each.

mation with his ground forces and aerial observation. When he knows the approximate position and number of the enemy and has studied the terrain, with particular view to its length, breadth, and height, he will then employ his helicopter companies. He uses them with the same ease and according to the same basic principles that an armored infantry battalion commander would have employed his "halftracks" in 1944.

To be effective, the commander and all subordinates must thoroughly understand and adopt the following characteristics of the maneuver: rapidity of decision, keen understanding of the terrain viewed through three dimensions, boldness, imagination.

Fighting guerilla warfare in Algeria does not monopolize all the activities of the ALAT. Some Army aviation units are stationed in France and are used for instruction or for other purposes.

The home of French Army aviation is located at Dax, a small city in the middle of the Landes forest, about 500 miles south southwest of Paris. There pilots and observers are trained in fixed and rotary wing aircraft.

Each of the branch schools has its own Army aviation unit, designed particularly to study within its branch the possibilities offered by Army aviation. There is also an Army Aviation Test Center at Satory (near Paris) which performs technical and tactical tests on aircraft and equipment proper to Army aviation.

Other units receive special missions. One unit conducts a survey of the flight and survival conditions in high mountains. Some of the pilots in this unit have already landed an TL-21 on the rough surface of a glacier near Mount Blanc at an altitude of 12,500 feet.

Strictly speaking, French aviation is not a separate branch. It is a versatile interbranch system forged by experience and led by an Army aviation staff working at the highest level.

Reality of everyday combat often stimulates active brains and imaginations to solve problems of operations. This is why French Army aviation has conducted several studies during the past years to improve efficiency of the units and security of the crews. The first series of studies were concerned with how to suppress the ground fire before the landing of the first wave of helicopters. There is a gap between the moment artillery fire is lifted, or Air Force straffing is stopped on the landing area, and the first landing of the cargo helicopters.

Sometimes there will not be any support because speed is of prime importance. Lack of support at this time must be overcome. If this is not accomplished, helicopters could be destroyed or damaged during their landing approach when they are most vulnerable. After many tests, it seems that the best solution is to arm the Alouette reconnaissance helicopters with rockets and guided missiles.

Even the L-19s were improved by arming them with smoke rockets under the wings. The smoke rockets permit the L-19 pilot to easily mark a target for the ground forces or fighter aircraft.

Various studies have been made concerning security of the crews. The H-21 helicopters have been fitted with autosealing tanks; the L-19s have been fitted with armored seats; and those which have to fly over the desert receive special equipment.

French Army aviation has faced the realities of combat since its inception, and has grown in spite of all obstacles. It is not only an essential component in the daily life of the army in the field, but its units have often been one of the prime determining factors in the favorable outcome of the fight. At the price of much hard work and many sacrifices, it has gained tremendous experience in the field of guerilla warfare which should prove valuable to French allies throughout the world.

CRASH SENSE

PREPARED BY THE UNITED STATES ARMY BOARD FOR AVIATION ACCIDENT RESEARCH

HURRY, HURRY, HURRY

COMES THE TIME for sap to start rising. Comes green grass and leaves. Comes short sleeves and bikinis. Comes longer days and patio barbeques. Comes the turning of a young man's fancy. And where does the Army Aviator's fancy turn? Naturally, it turns to the most exciting time of the year; it turns to coming MANEUVERS!

Maneuvers mean simulated combat conditions, the culmination of months of arduous training — a chance to demonstrate battle readiness — escape from the routine humdrum. Maneuvers mean field rations, sleeping bags, and long hours of hard work. Maneuvers mean the "hopped up" feeling of release.

What do maneuvers mean to YOU? Will you limit yourself to the abilities of training and experience? Or will you pull out all the stops and fly with reckless abandon? The SOP calls for a chopper on the old man's pad when an alert sounds. He needs to get a look at his troop units as they move out. Will you be the one to tell him the ceiling's too low? What about that driving rain through which you wouldn't think of flying under normal conditions? Will you tell him it's no go, or will you say, "To heck with it; these are battle conditions!" and go despite those warning butterflies?

Frequently, during maneuvers, the best laid plans change at a moment's notice. You may be called on to refuel and get airborne immediately. Should you take the extra time it requires to strain drum fuel through a chamois, or pour it straight from the drum, crank her up and leap off?

The Choctaw was refueled straight from drums, with no chamois or filtering equipment, and dispatched to pick up

Straining delays refueling

Hurry, hurry, hustle

troops in an impact area. The pilot completed his runup, found everything normal, and brought the aircraft to a hover. He climbed out and flew directly to the pickup point, where the ground party released a smoke grenade to indicate wind direction.

The pickup point was in a shallow bowl at an elevation of approximately 5,000 feet. The pilot began an elliptical pattern for landing because of the terrain features. He made a 180° turn to the left, flew straight and level for a short period, and began another left turn. When the aircraft reached an approximate bank of 20°, the engine failed. Altitude at this time was an estimated 180 feet and indicated airspeed was 60 knots. The pilot lowered collective pitch slightly and initiated a flare. First contact with the ground was made by the tailwheel at approximately 25 knots. The aircraft pitched forward and the main rotor blade sheared the tail cone from the fuselage. The aircraft rolled to its right side and skidded for 10 feet.

Engine failure was a result of contaminated fuel. There is an old saying: "The long way around is the shortest way home." An extra few minutes spent in straining the fuel would have saved this aircraft and permitted a successful mission. True, a few minutes were saved at the start. But the Choctaw didn't airlift its assigned troops; nor will this one ever airlift any other troops.

Generally speaking, maintenance in the field is as good as maintenance anywhere. That is, unless the hurry-up hustle of maneuvers leads to maintenance shortcuts.

The maintenance crew had worked around-the-clock changing the main gear box on a Choctaw. After the change was completed, the servos were removed and reinstalled on the new gear box. Rigging was checked by inserting rigging pins. The maintenance officer, who was to perform the test flight, made a preflight of the aircraft, with special emphasis on those components installed and rerigged. He started the engine and engaged the clutch. With rotor rpm at 2,000, he turned the primary servo switch off and checked the controls. All appeared normal. He then placed the servo switch in the "both" position and heard a loud noise.

The pilot asked the crew chief if he knew what the noise was, got a negative headshake, and continued the cockpit procedure. He placed the servo switch in the auxiliary "off" position and heard another loud noise. The collective pitch stick rose rapidly to the full up position, and the Choctaw left the ground and rolled to its left side, causing major damage.

The cause of the accident was malfunction of the pilot servo valves. Two cc of water

Preoccupation

were found in the boot of each valve.

Paragraph 2-555, TO 1H-34A-2 calls for a hydraulic "mule" to substitute the hydraulic pressure required to activate the servos. Had the "mule" been used in this case, it would have disclosed the malfunction prior to runup.

Further complicating the problem was a checklist prepared and distributed by another command, which prescribed 2,000 rpm as the setting at which servos should be checked. TM 1-1H-34A-1 specifies 1,500 rpm as the setting for performing this check. Had the servo check been made at the lower rpm, it is possible that lift generated during upward movement of the collective pitch would not have been sufficient to cause the accident.

Another case of the hurry-up shortcut and an aircraft which won't complete its mission.

It had been a hectic day for the pilot. Once, he had tried to take off with the cyclic control friction locked. Another time, he had almost taken off with a funnel and chamois still in the right gas tank of the Sioux. Now, he had one more resupply mission to complete as soon as the helicopter could be refueled.

The ground crew rolled a 55-gallon drum up and refueled the helicopter. The pilot and crew chief got aboard, fastened seat belts and shoulder harnesses, and the pilot started the engine. Another delay occurred when a mechanic ran to the aircraft with two packages for delivery. As the pilot brought the aircraft to a hover of approximately 2½ feet, the Sioux began to drift to the right. The 55-gallon fuel drum had been left standing 2 feet from the right skid, opposite the right fuel tank. The aircraft hit the fuel drum and tipped to the right. A roaring inferno enveloped aircraft and occupants as the aircraft struck the ground. The drum tipped over, and the Sioux came to rest with the right side of the fire wall resting on the drum and the heel of the right skid and tail section on the ground. An instant later, the aircraft fuel tanks ruptured and supplied more fuel for the fire.

No one bothered to tell the pilot

The pilot released his safety belt, fell into the fire and crawled out. He had second degree burns over 45 percent of his body. The crew chief, unable to release his safety belt, managed to slip beneath it, fell into the fire and crawled away. He suffered second degree burns on 35 percent of his body.

It was discovered that the left fuel tank cap had not been locked securely. This, plus the fact that the pilot had not released the cyclic control friction lock prior to flight and the position of the fuel drum at the time of takeoff all entered the scene as "hurry-up" cause factors.

The medical report stated that the hands and fingers of the pilot and crew chief were the most severely burned portions of their bodies. The extent of burns could have been decreased had they worn gloves.

The preoccupation of this pilot, indicated by his mistakes in earlier flights and those leading to the accident, were clearly a result of the hurry-up, shortcut urge.

The aviation company had been operating its Beavers in and out of a strip for several days. When density altitude was high, the aircraft were barely able to clear the trees after takeoff. Operations agreed to drain the rear tanks and limit the aircraft to four occupants. This condition was brought to the attention of the pilots, and notices were placed in the aircraft. However, one Beaver was absent when the placarding was carried out. The pilot of this aircraft made his takeoff. As the aircraft cleared the trees off the south end of

Of rotors and parachute

the strip, the engine failed. The Beaver descended into a grove of trees and the right wing was severed. There was major damage to all parts of the aircraft. Fortunately, there were no injuries. The pilot stated the crew chief informed him that the aircraft had been fully serviced. During preflight inspection, fuel was visible in the filler necks of front and center tanks, but was not visible in the filler neck of the rear tank. The pilot switched the fuel selector to the rear tank during the pretakeoff check and the takeoff was made with the selector in this position. Beaver fuel gauge needles give approximately the same indication when tanks are empty as they do for full tanks.

During the hurry-up hustle, no one remembered to mention the decision to drain rear tanks to this pilot.

Helicopters and parachutes are about as compatible as ice cream and dill pickles. One Chickasaw pilot discovered this the hard way. He was on a radio controlled aerial target (RCAT) recovery mission. He landed the Chickasaw beside an RCAT to make a pickup. The RCAT parachute, located about 20 yards away, billowed up into the aircraft's main rotor system. The pilot immediately applied rotor brake, but substantial damage was caused to the main rotor head.

This same pilot had made 25 previous pickups and had landed the same distance away on several occasions, with no difficulties. There was no SOP regarding recovery procedure; nor had any particular recovery technique been recommended to this pilot.

This accident was not a result of haste. Rather, it illustrates the point that all portions of every mission should be planned well in advance.

Accident records show that a similar accident involved a Sioux. The Sioux, performing a medical evacuation mission, was taking off when a loose parachute billowed up into the rotor. The interesting feature of the accident was that the aircraft was approximately 35-50 feet above the ground when the parachute tangled with the rotor blades. This illustrates the erratic behavior of loose parachutes when subjected to rotor downwash.

A Bird Dog aviator flew his battalion commander to a road strip for a rendezvous with the commander's jeep. Although wind was blowing directly across the road, 10 knots and gusty, the pilot landed. He discharged his passenger, fastened down the extra parachute, and made his runup in preparation for takeoff. He set the brakes and applied full power. As the aircraft gained speed, he applied forward pressure to hold it on the ground. At this point, a strong gust raised the right wing, causing the left wing to drop, and the aircraft veered to the left. The left wing struck two fence posts and the aircraft went through a barbed wire fence

The battalion commander's jeep was waiting

into a grain field, dragging the fence wire on its landing gear. The pilot cut his switches and reached to turn off the gas selector. The aircraft nosed over and came to rest inverted.

It is doubtful that this pilot would have attempted a road landing under these wind conditions if the old man hadn't been aboard and his jeep waiting below. But he was and it was and . . .

The IP was concerned about another aircraft

INSTRUCTOR PILOT

". . . instructor pilot was late in applying corrective action. Aircraft landed hard. . ."

". . . instructor pilot allowed student to autorotate aircraft too low for power recovery at low airspeed . . ."

Too little, too late

". . . instructor pilot failed to monitor go-around point. Aircraft landed long . . ."

The common denominator of these three excerpts was the same for 36 other major Army aircraft accidents during 1959. Instructor pilots face perhaps the most demanding challenge of all teachers. In no other field are training mistakes likely to cause such costly and sometimes fatal results. Whether the instructor pilot's job is to teach all phases of flight maneuvers to student aviators, or to increase and maintain proficiency of currently rated aviators, a fundamental part of this training is to instill good flying habits, both by example and by instruction. If he fails in either respect, he is laying the groundwork for future accidents.

Instructor pilots must exercise good judgment in dealing with students. Students pick up and retain the flying habits of their instructors. Incorrect procedures will be magnified by students' inexperience.

A heavy-handed instructor pilot can destroy a student's confidence. Permitting too much leeway, he may encourage dangerous habits. The IP's job is to maintain the proper balance between these two extremes.

An IP faces a different problem in teaching a rated pilot. He knows his student has the basic knowledge and ability to fly the aircraft, but he doesn't immediately know how well qualified the pilot may be. The rated pilot's experience level can cover a wide range, and considerable instruction may be necessary for him to become really proficient. This is where the IP's judgment must come into play.

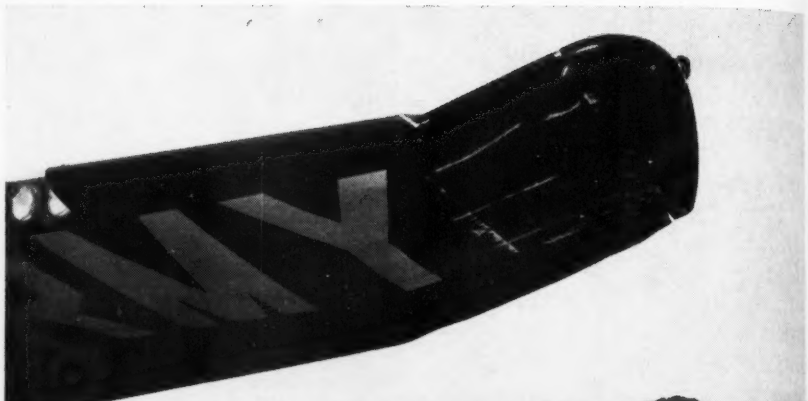
During a training period, an instructor pilot and student were making a normal climbout in a Raven. At an altitude of 150-200 feet, the IP called for a simulated forced landing. A high rate of descent was set up by the student. The IP did not check rotor rpm during the descent. The student made an initial slow application of pitch about 10 feet above the ground. The IP followed through, adding the remaining pitch. His action came too late and the aircraft made a hard landing,

Cockpit confusion

causing major damage to the one-inch drive shaft, brace assembly, and spring assemblies. The Raven bounced and the instructor made a power recovery and landed without further damage.

Aviators are always cautioned to keep a sharp lookout. However, abnormal concern caused one accident. The IP and his student were making a high reconnaissance of a confined area at an altitude of 500 feet. The IP cut the power and called for a simulated forced landing. The student S-turned the Raven toward the confined area, making a left and then a right turn on final. During the descent, the instructor cleared for other aircraft. He became so preoccupied with another aircraft that he failed to monitor the autorotation. As a result, when power recovery was begun, the Raven was too low. It was also too slow for a safe autorotative touchdown, and the hard landing caused the main rotor blade to flex into the one-inch drive shaft. The tail boom was buckled aft of the cardan joint. Fortunately, neither occupant was injured.

Cockpit confusion has caused many accidents. There's the story about the airline captain who noted that his copilot seemed depressed. He told the copilot to cheer up. The copilot thought the captain said "gear-up," and the four-engine transport settled to the runway on its belly. An example closer to home is the IP and pilot in an Otter who were training in the use of the glide scope light. The pair made several approaches before dark to familiarize themselves with the strip. After nightfall, they were able to clearly see the red, green, and amber lights of the glide scope and completed several landings. Surface wind was calm and landing was to the northwest. Takeoff was made to the southeast to avoid an unlighted fire tower to the northwest.



How far should you let the student go?

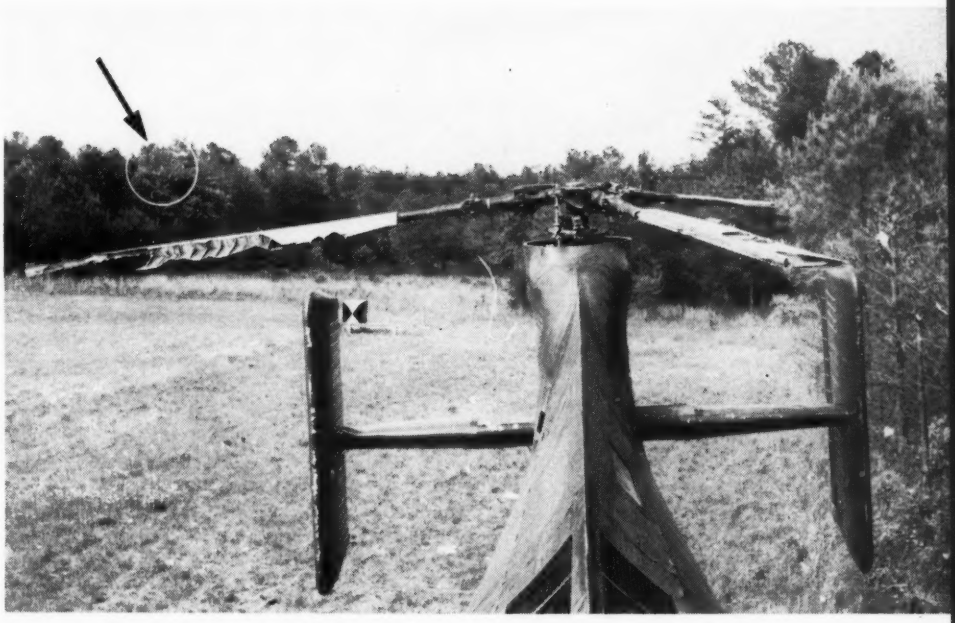
The last approach was normal, but the aircraft floated down the runway during roundout. "Ready with the brakes," the IP remarked, and the Otter touched down with brakes locked in a 3-point attitude about 350 feet from the approach end of the runway. The aircraft skidded for 270 feet and nosed over. As it pitched forward, loose equipment in the cargo compartment rained down on the pilots. If he hadn't mentioned the brakes, chances are the pilot would have made a normal stop.

After a student completed a simulated forced landing and climbout in a Bird Dog, the instructor took the controls,

The unexpected

telling the student he'd demonstrate how it should be done. Instructing the student to give him a simulated power failure somewhere on climbout, he made a running wheel landing on a road strip, took off and began the climbout. At 100 feet altitude, 60 mph airspeed, and with 30° flaps the student cut the power. The instructor immediately lowered the nose and put power back on. The engine didn't respond immediately and the aircraft struck trees, then fell to the ground and burst into flames.

The instructor was momentarily stunned, but he recovered in time to get out and pull the pinned student free. The aircraft was a total loss.



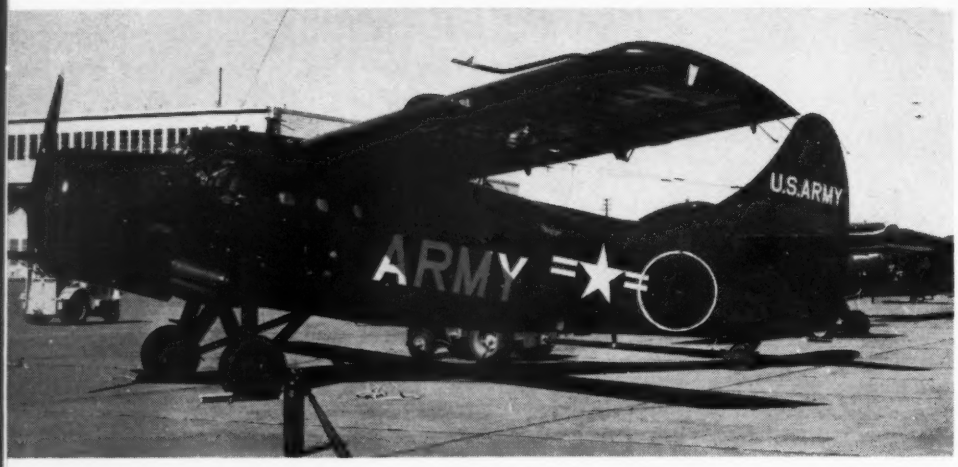
No margin for error

The importance of being understood can't be emphasized enough. A breakdown in communications has contributed to its share of accidents. The pilot, on a local checkout with the unit IP, made an approach to runway 24. Wind was from 315° at 6-10 knots. The pilot used 45° flaps and made a right wing-low touchdown. He lost directional control after a bounce and the Bird Dog ground-looped into the wind. The aircraft came to rest approximately 165° from the runway heading, after buckling the left gear and incurring major damage.

The technique attempted in this landing was correct. However, reaction of the pilot in correcting for the loss of directional control was slow and inadequate. This illustrates a few of the problems an instructor pilot can expect to encounter. Had this one been alert and taken control during the bounce, he might have salvaged the landing.

Overestimating ability

Overestimating a pilot's ability during transition training has caused headaches for many IPs. Shooting touch and go landings in an L-26, the IP pulled the mixture control on the right engine just after they became airborne at 25 to 50 feet altitude. The pilot had just made a power reduction when he lost power on the simulated engine-out operation on takeoff. He immediately lowered the nose, advanced both pro-



No tie-down ropes

peller controls to full rpm, advanced both throttle controls, and visually checked landing gear and flap indicators. He then closed the throttle of the left engine instead of the right.

The instructor pilot realized the error immediately and advanced the closed throttle. The engine did not develop power immediately and the aircraft settled toward the runway. When it was apparent the aircraft could not remain airborne, the pilot placed the aircraft in a slight nose-high attitude to reduce landing impact. The aircraft suffered substantial damage to the bottom of the fuselage.

An IP initiated a demonstration 180° autorotation in a Shawnee at 900 feet. His intended touchdown point was between the markers of a strip. During the final stage of autorotation, the right horizontal stabilizer struck a cottonwood tree, 4″ in diameter, 26 feet above the ground. The aft rotor blades shattered on impact with this tree and other trees in the immediate area. Six other trees were contacted, continuing destruction of the aft rotor blades and causing minor damage to the forward rotor blades. This IP left no margin for error. Contributing factors were an excessively wide turn on final and late application of corrective action.

The list goes on and on, proving what many have known all along: the job of IP is no cinch! Yet, many IPs continue teaching a wide variety of students flight after flight and year after year, without mishap to themselves or students. Do these IPs have some secret formula, some magic crystal ball to tell them when a student is proficient or warn them to take control? Unfortunately, such crystal balls are not available at QM, nor can you purchase one from the PX. The only real secret is no secret at all. The answer lies in the standards and limitations the IP imposes on himself and his students. Standards of performance should always be set at the highest possible level for both the beginning and experienced IP. Limitations are another matter. Just how far should you permit a student to stray from desired performance? The wise fledgling IP will set his limits fairly close, ensuring his ability to cope with the unexpected. As he builds experience and matures in judgment, he will learn to analyze his students' capabilities more accurately and can safely extend those limits.

If you have recently been assigned as a new IP, our hats are off to you. The IP has the most richly rewarding job in all aviation. The position you occupy in the eyes of your students, the visible day-by-day results of your efforts, and the gratitude you will receive bring the kind of satisfaction that you will find in no other assignment.

Remember: STANDARDS AND LIMITATIONS!

FOR THE WANT OF A ROPE

The Otter pilot taxied into the ramp and parked to refuel. The surface wind was gusting 20-38 knots from the west. He set the parking brakes and chocked the wheels, but could not tie it down because there were no tie-down ropes. He left the aircraft to look for some rope. In the meantime, a gasoline truck drove up and prepared to refuel the Otter. A sudden gust of wind caused the aircraft to jump its chocks and weathercock clockwise. As the Otter swung around, it struck the fuel truck's left front fender and damaged the left side of the fuselage.

Fortunately, this was a very minor accident and it cost only $235 to repair the aircraft. But it requires very little imagination to picture what could happen when an aircraft slams into a fuel truck loaded with thousands of gallons of gasoline.

Sufficient tie-down ropes are a must for all parking ramps. They should be inspected frequently and replaced when they show excessive wear.

Army Aeromedical Symposium

Hotel San Carlos

Pensacola, Florida

7-8-9 June 1960

AN ARMY-WIDE Aeromedical Symposium will be held at the San Carlos Hotel, Pensacola, Fla., June 7-8-9. Sponsored by the United States Army Board for Aviation Accident Research, the symposium is designed to orient staff surgeons and hospital commanders on aeromedical factors in aircraft accidents. Approximately 100 Army medical officers are expected to attend.

Prominent speakers in the field of aviation medicine, drawn from all three services and civilian agencies, will deliver papers on a wide variety of aeromedical subjects.

Colonel John P. Stapp (MC), USAF, Chief, Aerospace Medical Laboratory, Wright Air Development Center will speak on "Human Tolerance to g Forces in Aircraft Accidents." Colonel Stapp set the ground speed record for humans in 1954 on a 2,000 lb.-sled at Holloman Air Development Center, N. M. He reached a speed of 632 mph in 2,800 feet and in 5 seconds. The sled decelerated with a force of 35 g's and a wind pressure of more than 2 tons.

Captain E. M. Wurzel (MC) USN, Chief, Aeromedical Division, Naval Aviation Safety Center, will deliver, "Naval Flight Surgeon Program: Contribution of Navy Flight Surgeons to Accident Prevention."

Lt Colonel R. B. Austin (MC) USA, Chief, Aviation Branch, Office of the Surgeon General, Department of the Army, will have as his subject, "The Assignment and Utilization of Army Aviation Medical Officers."

Colonel Frank Townsend (MC) USAF, Director, Armed Forces Institute of Pathology, will speak on the "Importance of Pathology and Autopsy in Aviation Accidents."

Those who attend will spend one-half day touring the School of Aviation Medicine, Pensacola Naval Air Station. During this tour they will see demonstrations of an ejection seat, human disorientation device, dilbert dunker, low pressure chamber, acceleration g suit and full pressure suit.

Aviation medicine plays an increasingly important role as the complexity of aviation missions and equipment expand. A free exchange of information must be constantly encouraged to ensure the maximum well-being of all aviation personnel.

POWER *for* PEACE

"Modern military operations are not restricted to any particular element. The Army must fight as part of a team which includes forces of the other U. S. Armed Services and those of our allies. We are all well aware that land warfare is not conducted solely on the surface of the land. It includes the conduct of operations in the air above the land and in the waters contiguous thereto."
General L. L. Lemnitzer, USA.
Chief of Staff, U. S. Army